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THE Signature SERIES

NetworkWorld

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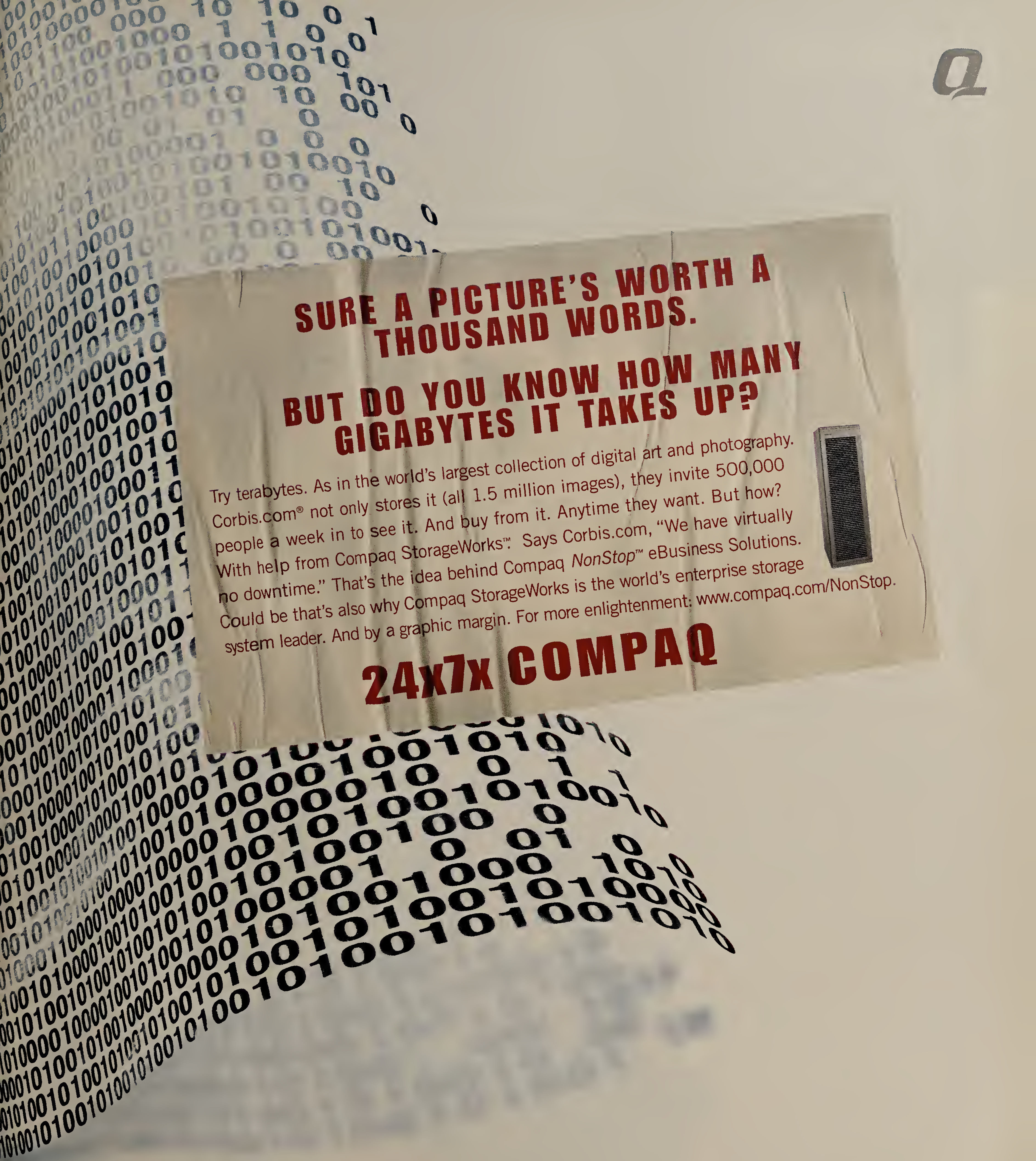

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HERE'S TO A POWERFUL START

The network industry is filled with powerful forces, from the companies that sit atop this world to the executives who run them and the technologies they peddle. In this, our sixth annual Power Issue, we take you on our traditional tour of those companies and people, and give you an overview of some of the biggest technology, management and policy struggles that will surely shape networking in 2000. This year, we also share tips for how you can increase on-the-job power and tell the story of how some moneyed network executives exert power in their communities. We hope you'll find it a powerful way to end this millennium and start the next.

— Beth Schultz
bschultz@nww.com

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- Our interactive Powerometer. Find out what network companies and CEOs have gained — and lost — power with end users. **DocFinder: 6135**
- Our 25 Most Powerful People in Networking list is ready for download. **DocFinder: 6136**
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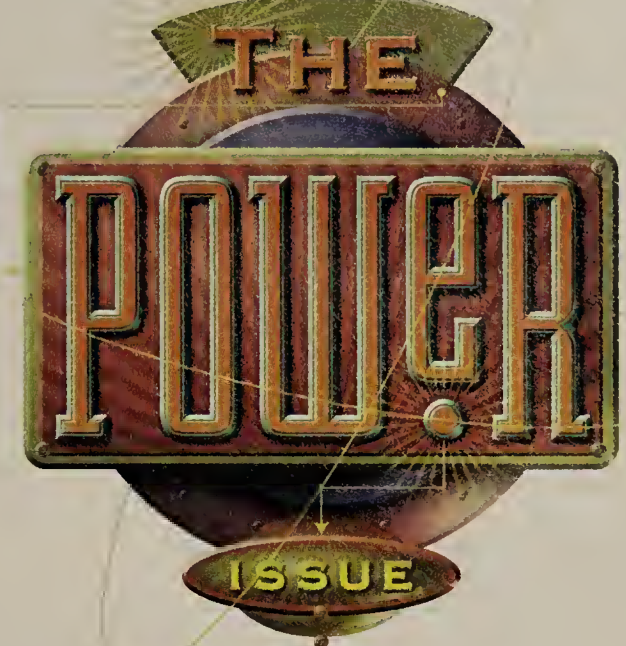

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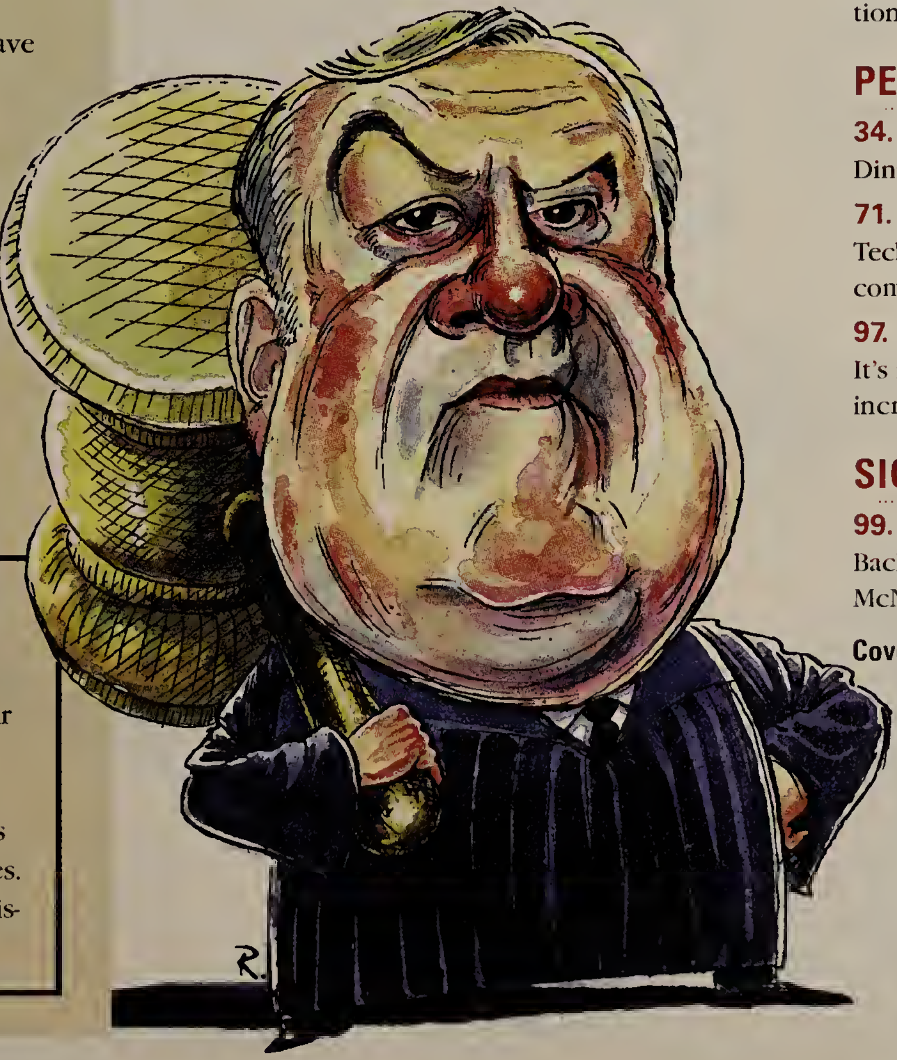
Cover art by Tom White Images



THE SIGNATURE SERIES

The Power Issue is one of six bimonthly supplements providing insights, opinions and information on the biggest trends shaping the networked world. Look for our guide to conducting business-to-business e-commerce in the next Signature Series installment, The Electronic Commerce Issue, coming Feb. 28.

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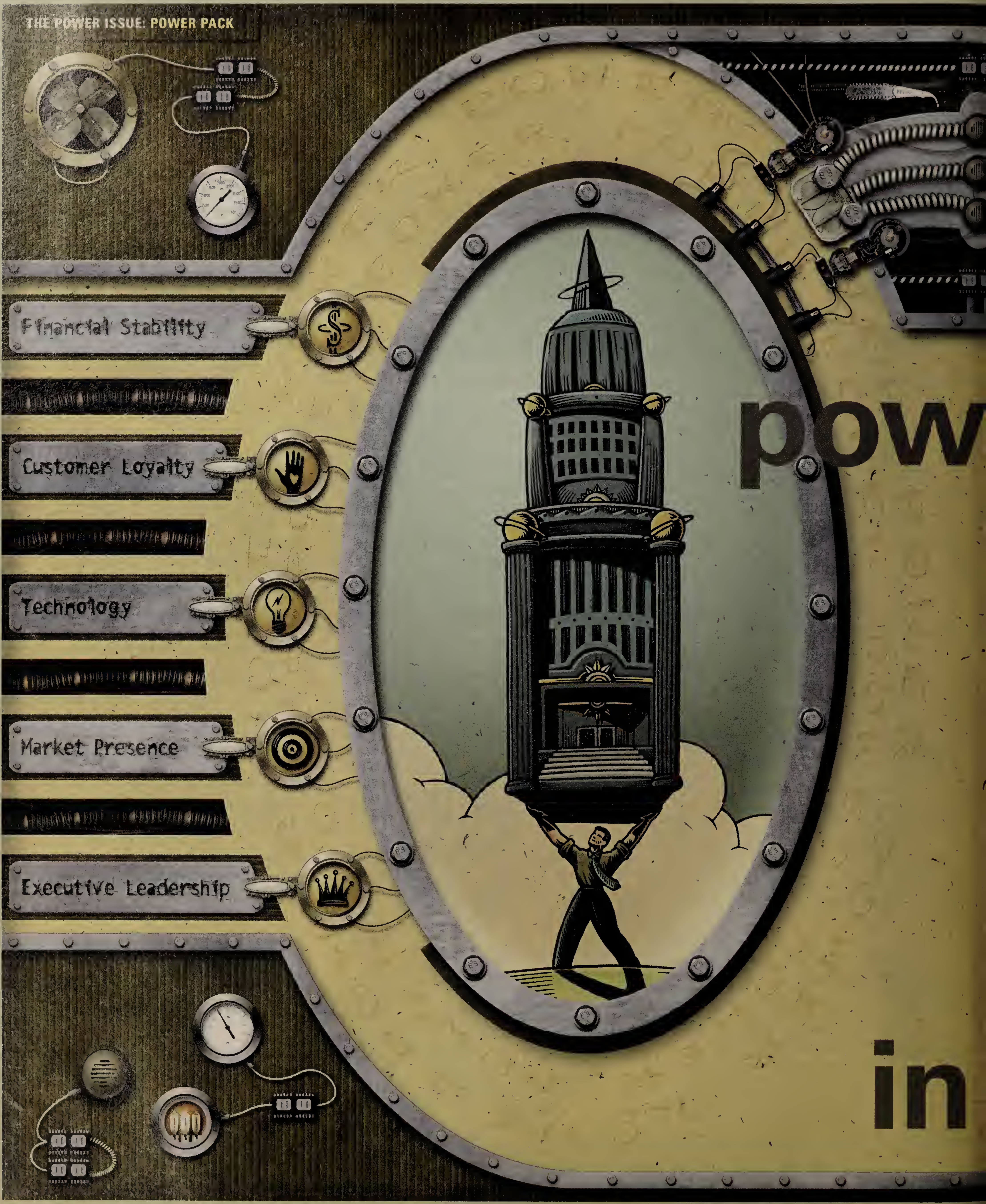
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in

The 10 most
erful companies
networking

BY *NETWORK WORLD* STAFF

The roster of elite network companies remains fairly consistent year after year, with stalwarts such as AT&T, Cisco, MCI WorldCom and Microsoft unquestionably grabbing seats on our "10 Most Powerful Companies in Networking" list. Still, some jockeying goes on to fill out the last third or so slots. See how companies rated among the Network World *staffers, analysts and other industry followers who vote on this power 10. Then take a look at how the same companies ranked among the 250 readers who participated in our annual Powerometer poll (see page 14). You'll note some interesting disparities.*

AT&T

Have you noticed how quiet AT&T has been about the proposed merger of MCI WorldCom and Sprint? Usually competitors protest mergers of their rivals.

Likely reason for the silence: AT&T knows it'll be the safe haven for disaffected MCI WorldCom and Sprint corporate customers if, as many observers believe, the merger turns into a mess. And that plays right into AT&T's strategy of finding new revenue to offset the bleeding in its consumer telephony business.

Chairman and CEO C. Michael Armstrong's first priority is top-line growth. And that's been lacking at AT&T recently. Excluding AT&T's purchases of IBM Global Network and cable company Tele-Communications, Inc. (TCI), AT&T's year-over-year revenue growth for the third quarter was 5.3% — anemic for the Internet age. The destruction of the dime-a-minute barrier for consumer long-distance led to a 4.7% decline in consumer revenue, and growth in corporate voice and data has been holding steady in the mid-teens.

The real stars are AT&T's wireless and outsourcing businesses, both rocketing up more than 40% in 1999. For all of the hullabaloo over MCI WorldCom's grab for Sprint PCS, AT&T's wireless portfolio is triple the size of Sprint's. And in 1999, AT&T Solutions, the outsourcing and managed-network unit, brought on such diverse businesses as AlliedSignal, McDermott International, brokerage firm A.G. Edwards and drugstore chain CVS.

But big wins in the enterprise market aren't enough. Armstrong must boost performance from his mass consumer and business transport sectors, and he's fighting key personnel defections. Business services President Bob Annunziata, who had run Teleport — the alternative local carrier AT&T bought in 1998 — left last spring to head Global Crossing. Consumer chief Leo Hindery, who had been No. 2 at TCI, bolted in September just as AT&T began the massive job of converting its cable plant into two-way Internet and telephony facilities.

So far, TCI is contributing about $1.4 billion per quarter in extra revenue but not a dime in profits. Sometime in 2000 AT&T will have to increase revenue for cable-modem service instead of ordinary cable TV if its bet on competing with the local telcos is to contribute to AT&T's 21st century leadership.

Cisco

The TV ads say it all: Virtually all Internet traffic travels across Cisco systems.

With that kind of clout, Cisco continues to play a key role in shaping and delivering the Internet economy. As more users take advantage of the Internet for business and commerce, the more dependent they become on Cisco for providing

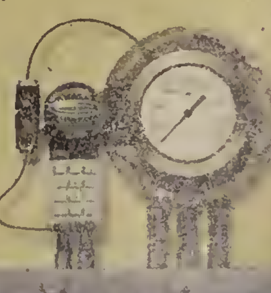

ILLUSTRATION: BOB CASE

the infrastructure.

Indeed, if customers vote with their dollars, Cisco wins by a landslide. Cisco announces at least four new customers every month. Having already sewn up the enterprise market, nearly all these latest contracts are in the fast-growing service provider realm.

As a result, Cisco wrapped up its 1999 fiscal year on July 31 with revenue of $12.2 billion, an increase of 43% over the previous year. The run rate for fiscal year 2000 is $16 billion. The company is among the most valuable in business today with a market capitalization of about $300 billion.

No wonder Cisco President and CEO John Chambers likes to boast that his company is growing faster than any key competitor, and is the fastest growing and most profitable company in the history of the computer industry. This perhaps makes Chambers the most powerful CEO in networking. But even outside of networking, he is considered one of the most innovative and dynamic leaders in global business today.

Cisco is also known for shaping technology. The company's market share establishes Cisco technology as the de facto standard in data networking. Cisco forces all competitors and standards bodies to build Cisco-compatibility into their products and specifications.

It also makes Cisco ownership a goal for many a network start-up. True to course, Cisco has acquired more than a dozen companies this year — Cerent, Calista, Monterey Networks and Sentient Networks among them.

Dell

Dell, capitalizing on the success of its direct sales model, made a strong go of it in the enterprise network market this year by fleshing out a full range of servers and storage. The servers run the gamut from departmental and workgroup servers to powerful eight-way servers for use in transaction-intensive environments.

Two Dell servers even won *Network World* World Class Awards for scoring above a 9.5 (out of 10) in comparative tests and Best of the Tests Awards for rating among the top 10% of all products tested through October. Dell was the only vendor that had more than one product earn either of these awards.

In the burgeoning storage arena, Dell moved into the high-end of the market with the introduction of a 4-terabyte disk drive. And the company made its first-ever acquisition by buying Convergenet, which makes a magic black box that lets any server attach to any type of storage.

Besides delivering solid products, Dell rolled out a set of service programs aimed at helping customers implement and install its hardware. Two multibillion-dollar equipment and technology deals with IBM bolstered its portfolio.

Dell also became a factor in setting standards in the past year: It was one of Intel's first partners in the System I/O specification, which affects the future system bus. And Dell turned up the heat on e-commerce. At present, the company does $35 million in business over the Internet per day.

As for its mainstay PC business, Dell took over the No. 1 market share slot in the U.S. and the No. 2 position worldwide. The company is turning users' heads, and in the hot PC world, any sales Dell can take from its eastern Texas rival, Compaq, pushes it toward dominating the market.

In 1998, Dell revenue was $18.2 billion; its revenue is tracking this year at a 42% increase.

IBM

How did staid, stolid old fogy IBM make it onto this list?

The company might have sold off its switching and routing patents to rival Cisco, but it remains a market leader in SNA and token-ring technologies, and it does nothing these days except talk about the networked world of business.

Big Blue is actively pushing to make its mainframes, midrange and PC servers all Internet friendly. Meanwhile, its massive storage division has been refocusing itself to become a major storage-area network player.

IBM boasts the largest services organization in the world, with a heavy focus on e-commerce and SNA-to-IP migration. In software, IBM is second in volume only to Microsoft, spearheading work on Java, business intelligence, data mining and XML.

Its SecureWay networking unit is an industry leader in creating a comprehensive package for network security, from firewalls to content filters to encryption and more, all centrally managed. IBM also has an impressive array of network software products — the WebSphere and Lotus Web serving and e-mail packages; Tivoli enterprise management tools; the DB2 database; and the MQSeries application messaging product, among others.

IBM is active on industry standards bodies and has been one of the most vocal proponents for the creation of e-business privacy policies. The company will continue to exert influence with its OEM business — supplying chips, disks and other components to major server and network vendors.

IBM's steely Chairman and CEO Lou Gerstner has reassured employees, stockholders and customers that IBM is going to be a major force in the network. Whatever the long-term success, he's got all 300,000 IBM employees thinking networking in general and e-business in particular.

So it really isn't your father's IBM anymore.

Intel

It used to be that Intel more or less dabbled in networking. Not anymore — it got serious, real serious, about networking in 1999.

First came the technology investments. The company has bought its way into hot product areas, such as virtual private networks via the Shiva acquisition and Gigabit Ethernet switching through its XLNT buyout. Intel's goal is to provide small and midsize companies with key network products, running the gamut from network interface cards to routers.

Then came the Internet services assault. Who could have imagined Intel moving into the ISP business? But indeed, it has.

In September, the company announced the creation of the Intel Online Services division for Web hosting. Out of the starting block, Intel Online Services was running with two operational Internet services centers (at least three others are planned) and providing collocation services to customers. In early 2000, Intel will accelerate from Web hosting to the provisioning of application services, including e-commerce. It wants to work directly with enterprise users as well as provide the hosting facilities for other service providers, and it seems as if the company is being taken seriously.

Intel Online Services is working with UUNET in creating the Internet services and with top consulting companies on its application hosting plans. Meanwhile, it's already garnered Web hosting business with organizations such as eHobbies and Excite@Home Shopping Services.

Intel's chief concern remains selling processors, and what better way to drum up business than by helping build networks capable of handling increasingly faster computers? Its network business accounted for about 10% of the company's $26 billion in 1998 revenue.

MCI WorldCom

MCI WorldCom's year has been yet another one full of acquisitions as the company solidifies its position as one of the largest service providers in the country and rounds out its portfolio with wireless networks and services.

MCI WorldCom acquired fixed wireless service provider CAI Wireless for $213 million and wireless paging company SkyTel for $1.8 billion, and invested $300 million in wireless Internet access service provider Metricom. And last but certainly not least, it's in the midst of acquiring Sprint in a deal valued at $115 billion.

The combined entity, which will simply be called WorldCom, will include four frame relay and ATM networks, two national ISP networks, two long-distance voice networks and multiple local voice networks scattered throughout the country. And most importantly, MCI WorldCom will be getting Sprint's crown jewel, a digital wireless network that reaches more than 280 markets in all 50 states. Sprint PCS is the largest personal communications services network and a huge win for MCI WorldCom.

MCI WorldCom announced the merger plans in early October, just two months after it suffered

Continued on page 12

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its worst public relations nightmare. Due to an over-congestion problem on a legacy frame relay network, more than 3,400 MCI WorldCom frame relay customers experienced everything from dropped packets to complete loss of service. They received an unpleasant message: Integration problems are still very real 17 months after the MCI/WorldCom merger. At best, business users can only question how well MCI WorldCom will integrate Sprint assets into its existing network hodge-podge.

But these complaints haven't seemed to hurt the service provider's stock price, which continues to grow. In fact, as of press time, it was up $20 over the year prior.

Microsoft

Need we say more about Microsoft's power than did U.S. District Court Judge Thomas Penfield Jackson?

In November, the judge declared the company a monopoly in the operating system market as part of his findings in the government's antitrust suit against the software giant.

That's a federal mandate on Microsoft's strength. Although, in due time, it's a mandate that may eventually help weaken the company.

But Microsoft wasn't just sitting in court in 1999; it recreated itself in the eyes of the Internet. The company was reorganized into divisions focused on customers, including those in the enterprise, with no-nonsense President Steve Ballmer at the helm.

One weakness the company showed during the year was Windows 2000, which is still limping toward final release. But even the much-delayed operating system, with its unheard of 750,000 beta testers, showed the strength of the company's customer base.

Despite a number of key defections, including Brad Silverberg, who was instrumental in developing Windows, Microsoft grew. Revenue in 1999 was up $4.5 billion over the $15.3 billion reported in 1998. On the Windows platform alone, revenue grew by $2.2 billion, nearly double the growth between 1997 and 1998.

Microsoft also sought strength by diversifying, investing in cable TV, broadband, service providers and wireless ventures. The most dramatic investment was a $5 billion stake in AT&T. The deal will put Windows CE in five million AT&T cable set-top boxes. Microsoft also released a hosted version of its Office productivity suite, the strongest indication yet of its plans to bull into the application service provider market.

In short, look out 2000.

Nortel Networks

For Nortel Networks, 1999 will go down in history as the year in which its market value reached $100 billion. Surely that places the company in the big leagues, as if it wasn't already there.

Granted, Nortel has had its difficulties in the enterprise market. But it is the only router vendor in sight of Cisco, and the company is getting tougher by the day. In early November, Nortel slashed prices on its enterprise access routers. Customers shopping around will find the Nortel routers at half the list price of comparable Cisco products.

Aggressive router pricing is just one of the ways Nortel expects to gain an edge in 2000 (CEO John Roth says he wants to boost corporate sales by 10% next year). Another way is by licensing software that makes it easy to IP-enable just about any device you'd want connected to the 'Net — servers, PCs, network processors, mass-market appliances, set-top boxes and mobile devices.

The software, called Open IP Environment, will provide IP functions such as routing, tunneling and security, and IP applications such as policy and network management. Nortel says it already has 75 licensees for the software, and Intel has committed to offer parts of Open IP Environment with its recently announced Internet Exchange Architecture.

Nortel has been fairly acquisitive in 1999, as well. It's working on the acquisitions of Clarify, from which it gets e-business software; and Qtera Networks, for optical networking technology; and has completed the buyouts of Periphonics, for its computer-telephony expertise; X-CEL Communications, for its service-level agreement products; and Shasta Networks, for IP products.

Nortel's tough posture in 1999 has led to a tripling in its stock price and a rise to $100 billion in market value.

Novell

Unlike the majority of the companies on our "10 Most Powerful" list, Novell isn't making a repeat appearance. The company's performance just wasn't quite up to snuff in 1998. But 1999 has been Novell's year, and the company has handily reasserted itself as a top player in the network business.

Novell doesn't have nearly the financial might of the other companies here, but still, it's going — and growing — strong. The company closed fiscal year 1999 (ended Oct. 31) with revenue of $1.3 billion. It attributes the 17% increase over 1998 year-end revenue to directory-related business.

Indeed, Novell pushed hard in 1999 to secure dominance in the directory market. Its most recent manifestation of that thrust was the mid-November announcement of eDirectory, targeted at dot-com ventures, and Novell Directory Services Corporate Edition, an eDirectory-based application tailored for use within the corporate firewall. The backing of big-name users such as CNN is a definite plus.

Novell also has big plans for a metadirectory, via its announced dirXML software. DirXML will use XML-based metadata to manage a growing range of applications, services, data types and other resources. Novell's plans so impressed James Kobielus, a Burton Group analyst and *Network World* columnist, that he chose dirXML as a category-breaking product in our Best Issue (Nov. 15, page 87).

While NDS stars in Novell's comeback, products such as NetWare 5 and ZENworks have had their moments. And in our recent Best Issue reader surveys, Novell bested all other network players in the "Best Vendor Web Site" category and competitors such as Microsoft and SunSoft in the network operating system category.

We'll see if Novell can carry the momentum through 2000 — and the release of Windows 2000 and Active Directory.

Sun

Powerhouse Sun reshaped itself this year as an Internet enabler, capping the transition by forging an alliance with Lucent to build a network infrastructure for supporting next-generation 'Net business applications.

As part of the deal, Lucent will spend $500 million over the next seven years on Sun servers and Solaris operating system licenses. It'll be using those products in a new wireless network and for optical networking. Additionally, Sun and Lucent will jointly market network systems for e-business to enterprise users and service providers.

Sun already had been doing so, having turned to service providers to supply applications, e-commerce and network services, and having partnered with Motorola to drive the convergence of wireless IP with voice, video and multimedia. Sun also partnered with America Online to develop e-commerce applications, hence the Sun-Netscape Alliance, and to use Java to help users access AOL.

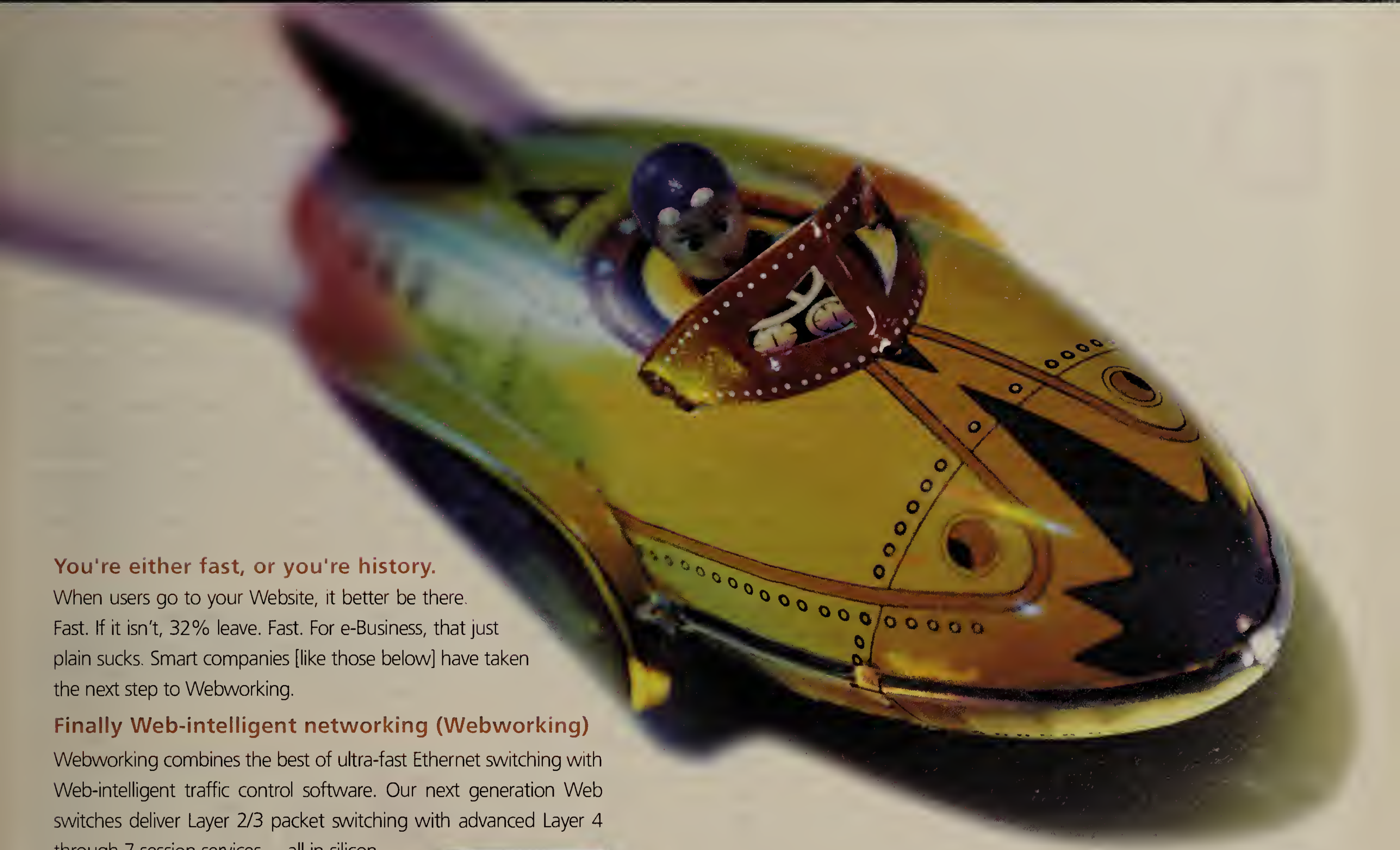
On the product front, the company announced iPlanet Webtop, software that gives users access to network applications, files, calendars and e-mail from a Web browser, and allows customers to build secure portals for mobile employees and supply chain customers.

This past year Sun also released Version 2 of Java, an environment for developing Web-centric applications that can run on any platform, and introduced Jini, its plan to network-enable any type of device regardless of underlying software or hardware. In addition, Sun was active in storage and operating systems, unveiling Jiro, an open storage management specification, and Solaris 7, its 64-bit operating system for Sun servers and workstations.

Sun revenue increased to $11.7 billion this year. However, the company closed 1999 on a downbeat, announcing it would no longer push Java to become an international standard. ■

Simple Web Truth #2

SPEED DOESN'T KILL, *Slow* KILLS



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1999 POWEROMETER Cisco

Our annual reader poll of the most powerful network companies portends Cisco's rise to the

Don't believe what you see in the top slot of our Most Powerful Companies chart: Cisco is the big winner in this year's Powerometer survey, our annual reader poll of the most powerful people and companies in networking.

Sure, Microsoft still came out on top, but its margin has dwindled to almost nothing. Across the board, no matter how the power question was asked, the 250 respondents thought less of Microsoft this year than last. And the survey was taken in October, before Judge Thomas Penfield Jackson (a pretty powerful guy) said Microsoft was a monopolist that doesn't play fair.

Cisco, meanwhile, closed Microsoft's lead to a mere seven-tenths of a percentage point in the Power Rating. If our other indicators prove correct, next year Cisco will land the top spot. It already holds the top position in the Power Gain Index, which is derived by subtracting the percentage of respondents who think a company lost power in 1999 from those who say the company gained power. Cisco scored a whopping 73.2 on the Power Gain Index, nearly 20 points above Lucent and MCI WorldCom, which tied for second at 55.2.

On the Power Predictor scale, which is calculated the same way as the Power Gain Index but asks respondents whether a company will gain or lose power in 2000, Cisco again came out on top. It scored 70.4, slightly more than 10 percentage points higher than second-place MCI WorldCom and its 59.2. Microsoft came in fifth with a score of 47.2, which is exactly the same as last year's score. Cisco's was 19.2 points higher. Beginning to get the picture?

A final clue that this will be Microsoft's last year atop the Most Powerful Companies chart lies in a number you won't find on any of the charts. But if you add the Power Gain score to the Power Predictor score, you get an idea of which companies readers think are truly powerful. Here are the top five and their scores: Cisco, 143.6; MCI WorldCom, 114.4; Lucent, 113.2; Sun (including the Sun-Netscape Alliance), 94.8; and Microsoft, 89.6.

A few other companies deserve mention for their 1999 power surges, including the three that most improved their position vs. last year on the Most Powerful Companies chart: Sun (up three spots, to No. 6), Nortel Networks and Network Associates (up five spots each, to No. 12 and No. 14, respectively).

Sun also had the largest net gain from last year on the Power Gain and Power Predictor charts, with 16.8 and 20.8 percentage point improvements, respectively. The Internet revolution has been good to Sun, fueling demand for its servers, Java products and services.

Sun's alliance with Netscape no doubt helps, too. And to think Sun paid only $350 million for the right to resell Netscape software while America Online paid $4.2 billion to buy Netscape.

Nortel likewise had a reasonably good year, with its five-spot jump on the overall Most Powerful Companies chart. But strangely, the company made no impressive gains in any of the other power categories except the Power Predictor; it placed sixth there in terms of biggest rating gain from last year. Stay tuned — Nortel could be in for a good run next year.

MOST POWERFUL COMPANIES

We asked 250 *Network World* readers to rate the companies on a power scale of one to 100, with 100 being the most powerful. The Power Rating is the mean of all reader responses.

		1999 Power rating	1998 Power rating	Gain/loss	1998 Rank
1	Microsoft	80.9	80.5	0.5	1
2	Cisco	80.2	75.2	6.2	2
3	Intel	75.9	73.9	2.64	3
4	AT&T	71	66.8	5.85	5
5	Lucent	70.8	66.4	6.2	6
6	Sun/Netscape	70.6	63.2	10.57	9
7	IBM	70.5	66.4	5.8	6
8	3Com	67.7	67.7	0.04	4
9	Hewlett-Packard	67.6	62.6	7.36	11
10	MCI WorldCom	67.1	65.4	2.51	8
11	Oracle	66.9	62	7.36	12
12	Nortel Networks	62.6	55.6	11.18	17
13	Novell	62.3	62.8	-0.8	10
14	Network Associates	60.7	54.1	10.84	19
15	Sprint	59.4	57	4.06	15
16	BellSouth	58.9	54.9	6.77	18
17	Bell Atlantic	58.3	56.3	3.35	16
18	Compaq	57.6	61.5	-6.78	13
19	Computer Associates	56.4	53.3	5.44	20
20	GTE	54.4	53.3	2.08	20
21	Qwest*	51.5	N/A	N/A	N/A
22	Cabletron	50.8	52	-2.48	22
23	SBC	50	51.2	-2.35	23
24	US West	49	47.8	2.58	25
25	Newbridge Networks	40.5	44.4	-9.44	26

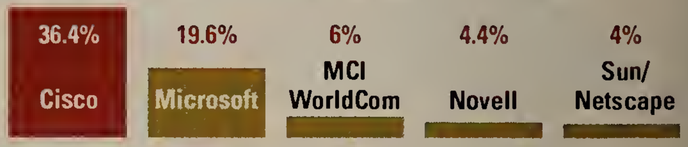
* Not on last year's list

GAINERS AND LOSERS

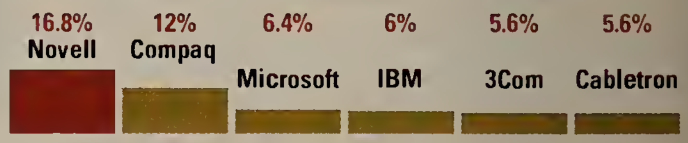
We asked respondents to pick the companies that gained and lost the most power in 1999, and are set to gain and lose the most power in 2000.

Percentage of respondents

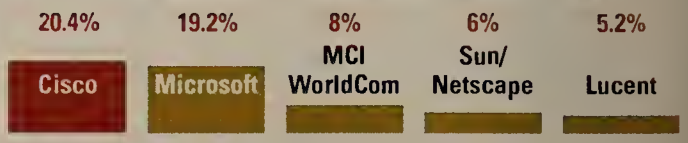
Which single company gained the most power in 1999?



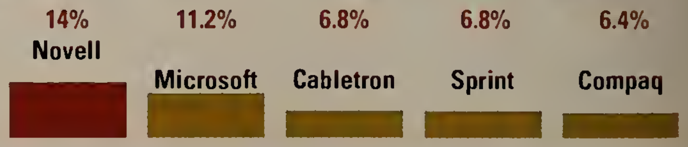
Which single company lost the most power in 1999?



Which single company will gain the most power in 2000?



Which single company will lose the most power in 2000?



rides a power surge

top in 2000. BY PAUL DESMOND

Network Associates is a similar story, posting a solid gain in the Most Powerful Companies category, but the firm actually lost ground vs. last year in its Power Gain rating and posted only a 2.8% gain in the Power Predictor. Those kind of numbers are typical of companies in the middle of the Powerometer pack. So what accounts for Network Associates' big jump in the Most Powerful Companies chart? It could be simply that the company is in a hot product area — network security.

Among other notables is BellSouth, which posted the third-largest jump in the Power Gain Index and fourth-largest in the Power Predictor. MCI WorldCom likewise did well in both categories, tying with Oracle and Sprint for the fifth-largest increase in the former and coming in with the third-largest in the latter.

But Sprint paid the price for MCI WorldCom's gain, with a relatively large drop in the Power Predictor Index. Sprint will cease to exist once — if — it is folded into WorldCom.

And now, the bad news

Talk of "fourth from last" brings us to the other side of the story: the big losers. Just as Cisco is the undisputed winner, Compaq is the goat. The company is in a veritable power free fall, dropping five spots on the Most Powerful Companies chart and posting the largest percentage loss vs. last year in the Power Gain (a 43.2% drop) and Power Predictor (a 29.2% drop) categories. Compaq's -8.4 Power Gain Index was the only negative figure in that category. And, asked to name the single company that lost the most power in 1999, 12% of respondents said Compaq, the second-highest percentage of any company.

First in that category was Novell at 16.8%, an indication of the power outage the company suffered in 1999 after making solid gains in the 1998 Powerometer survey. Novell dropped three slots on the Most Powerful Companies chart to No. 13 and came in next-to-last in both the Power Gain scoring (to Compaq) and Power Predictor (to Newbridge Networks).

Novell did top two other categories, but it was named by 9.2% of respondents as the company that should have a good deal of influence over the industry but doesn't and by 14% as the company that will lose the most power in 2000. Looks like Novell might need something more than a directory to make a splash.

3Com dropped four spots in the Most Powerful Companies chart, had the second-highest percentage loss vs. last year in the Power Gain and Power Predictor indexes, and was one of five companies deemed to have lost the most power in 1999.

3Com competitor Cabletron is likewise petering out, power-wise. It is fourth from last in all three main power indicators: Most Powerful Companies, Power Gain and Power Predictor. Cabletron tied with 3Com for fifth as the company that lost the most power in 1999 and is third on the list of companies expected to lose the most power in 2000.

An argument could be made that Cabletron's position is better than Newbridge's, however. Newbridge came in dead last on the Power chart, last in Power Predictor and third to last in Power Gain. It didn't come up at all on the "single company" questions; at least Cabletron came to mind among respondents. ■

COMPANY POWER GAIN

	1999 Index	1998 Index	Gain/loss
Cisco	73.2	58	15.2
Lucent	55.2	56.3	-1.1
MCI WorldCom	55.2	49.6	5.6
Sun/Netscape	44	27.2	16.8
Intel	42.8	47.6	-4.8
Microsoft	42.4	56	-13.6
AT&T	42	35.6	6.4
Oracle	37.6	32	5.6
IBM	34.8	30	4.8
Nortel Networks	32.4	27.2	5.2
Hewlett-Packard	31.2	26.4	4.8
3Com	29.6	43.2	-13.6
Qwest*	28.8	N/A	N/A
Sprint	26.8	21.2	5.6
Bell Atlantic	24	26	-2
BellSouth	22.4	12.8	9.6
Network Associates	20.8	23.6	-2.8
Computer Associates	16	14.4	1.6
SBC	15.2	20.8	-5.6
GTE	11.2	10	1.2
US West	8.8	10.8	-2
Cabletron	4.8	4	0.8
Newbridge Networks	3.6	8.8	-5.2
Novell	2.4	10	-7.6
Compaq	-8.4	34.8	-43.2

* Not on last year's list.

COMPANY POWER PREDICTOR

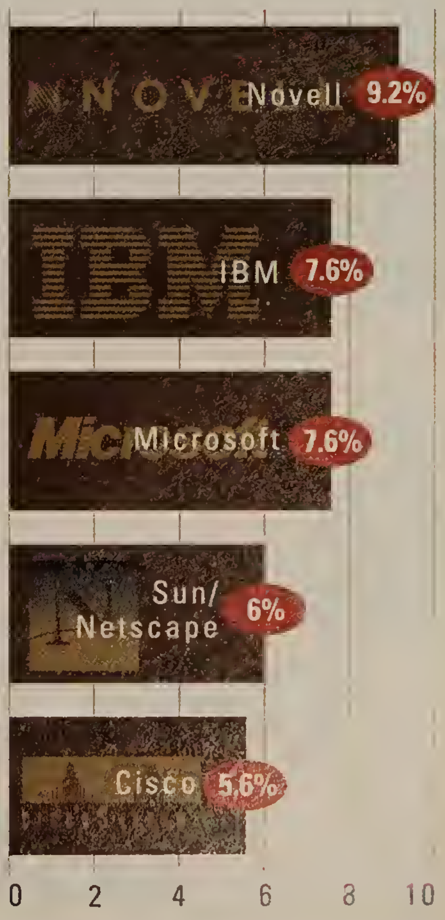
	2000 Index	1999 Index	Gain/loss
Cisco	70.4	51.2	19.2
MCI WorldCom	59.2	46	13.2
Lucent	58	54.8	3.2
Sun/Netscape	50.8	30	20.8
Microsoft	47.2	47.2	0
Intel	45.2	52.4	-7.2
AT&T	44.4	40.8	3.6
Oracle	42.4	40.8	1.6
Hewlett-Packard	41.6	30.8	10.8
IBM	40.4	35.6	4.8
Nortel Networks	35.2	28.4	6.8
3Com	33.6	49.6	-16
Qwest*	32	N/A	N/A
BellSouth	27.2	16	11.2
Bell Atlantic	26.8	26.4	0.4
Network Associates	24	21.2	2.8
Sprint	22.4	30.8	-8.4
Computer Associates	17.2	14	3.2
SBC	15.6	19.6	-4
GTE	12	10	2
US West	9.2	12	-2.8
Cabletron	8.8	6.4	2.4
Compaq	7.2	36.4	-29.2
Novell	2.4	16.8	-14.4
Newbridge Networks	2	6.8	-4.8

* Not on last year's list.

POWER PROBLEM

We asked respondents what single company should have more influence but doesn't.

Percentage of respondents



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Finally, illuminate problems through the application layer with our Protocol Inspector™. You'll have the power of full seven-layer decodes with expert analysis. Advanced filtering and triggering let you find offending packets in whatever dark corner they may be lurking.

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Company

Division/Mail Stop/Military Branch or Base

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City State Zip

Business phone (____) ____________________ FAX (____) ____________

Internet E-mail address ____________________

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☐ Check here If you DO NOT wish to receive this Information.

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☐ My home address is also my business address.

Optional delivery address: Enter your home address below if your company will not accept delivery at your business address:

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B100

1. What is the principal business activity at your location?
(check ONE only)

01. ☐ Manufacturing (other)
02. ☐ Finance/Banking
03. ☐ Insurance/Real Estate/Legal
04. ☐ Health Care Services
05. ☐ Hospitality/Entertainment/Recreation
06. ☐ Media/TV/Cable/Radio/Print
07. ☐ Retail/Wholesale Trade/Business Services
08. ☐ Transportation
09. ☐ Utilities/Process Industries (Mining/Construction/Petroleum Refining/Agriculture/Forestry)
10. ☐ Education
11. ☐ Government
12. ☐ Military
13. ☐ Aerospace
14. ☐ Consulting (Independent) *
15. ☐ Carriers/Service Providers
16. ☐ Internet Service Provider (ISP)
17. ☐ Manufacturing (Computer/Communications/OEM)
18. ☐ Resellers of Computer/Network Products (VARs,VADs)*
19. ☐ Systems/Network Integrators*
20. ☐ Distributors (Computer/Communications)*
21. ☐ Other (please specify) ____________

*Attn Consultants, Integrators, Distributors, Resellers: Please complete entire form based on ALL clients and your own business needs

2. P: What is your primary job function? (check ONE only)
S: What is your secondary job function? (check ALL that apply)

P S
☐ 1. ☐ Network Management
☐ 2. ☐ LAN Management
☐ 3. ☐ Datacom/Telecom Management
☐ 4. ☐ IS/IT/MIS/CIO/CTO/Systems Management
☐ 5. ☐ Internet/Intranet/e-Commerce Mgmt, Webmaster
☐ 6. ☐ Engineering Management
☐ 7. ☐ Corporate Management (CEO, COO, CFO, Pres., VP, Dir., Mgr.)
☐ 8. ☐ Consultant (Independent)
☐ 9. ☐ Other (please specify) ____________

3. What is the estimated value of Network equipment and services that you specify, recommend or approve the purchase of?
(Please print the appropriate number code on the line next to each product category. Please complete ALL categories A–N.)

1. $100 Million or more
2. $50 Million to $99.9 Million
3. $25 Million to $49.9 Million
4. $10 Million to $24.9 Million
5. $1 Million to $9.9 Million
6. $100,000 to $999,999
7. $50,000 to $99,999
8. Under $50,000
9. None of the above

A ____ Large Systems *(Mainframes/Minis)*
B ____ Desktops *(Micros/Laptops/Workstations/PDAs)*
C ____ Servers
D ____ LANs
E ____ WAN Equipment
F ____ Carrier Services
G ____ Internetworking
H ____ Internet
I ____ Intranet
J ____ Extranet/Ecommerce
K ____ Remote Access
L ____ Peripherals *(including storage)*
M ____ Software
N ____ Service/Support

4. What is the total number of sites for which you have purchase influence?
(check ONE only)

1. ☐ 100+ 2. ☐ 50 – 99 3. ☐ 20 – 49 4. ☐ 10 – 19 5. ☐ 2 – 9 6. ☐ 1 7. ☐ None

5. What is the total number of Servers/Clients/LANs installed/planned at your location/in your entire organization?
(check ONE box in each column)

SERVERS At Location A		SERVERS Entire Org. B	CLIENTS At Location C		CLIENTS Entire Org. D	LANS At Location E		LANS Entire Org. F
☐	1. 50,000+	☐	☐	1. 50,000+	☐	☐	1. 50,000+	☐
☐	2. 10,000 to 49,999	☐	☐	2. 10,000 to 49,999	☐	☐	2. 10,000 to 49,999	☐
☐	3. 1,000 to 9,999	☐	☐	3. 1,000 to 9,999	☐	☐	3. 1,000 to 9,999	☐
☐	4. 100 to 999	☐	☐	4. 100 to 999	☐	☐	4. 100 to 999	☐
☐	5. 50 to 99	☐	☐	5. 50 to 99	☐	☐	5. 50 to 99	☐
☐	6. 10 to 49	☐	☐	6. 10 to 49	☐	☐	6. 10 to 49	☐
☐	7. 1 to 9	☐	☐	7. 1 to 9	☐	☐	7. 1 to 9	☐
☐	8. none	☐	☐	8. none	☐	☐	8. none	☐

6. What is your scope and involvement in purchasing decisions for network products and services for your enterprise?

A. Scope (check ONE only)

CORPORATE:
1. ☐ Entire Enterprise/Multiple Enterprises
2. ☐ Division/Multiple Divisions
3. ☐ Department
4. ☐ None

B. Involvement (check ALL that apply)

1. ☐ Create Network/IT Strategy
2. ☐ Recommend/Specify Brand
3. ☐ Approve Purchase
4. ☐ Evaluate Products/Services
5. ☐ Determine the Need
6. ☐ None

7. What is the estimated number of employees at your location/in entire organization?
(check ONE in each section)

A. At your location:
1. ☐ Over 20,000
2. ☐ 10,000 – 19,999
3. ☐ 5,000 – 9,999
4. ☐ 2,500 – 4,999
5. ☐ 1,000 – 2,499
6. ☐ 500 – 999
7. ☐ 250 – 499
8. ☐ 100 – 249
9. ☐ 99 or less

B. Entire organization:
1. ☐ Over 20,000
2. ☐ 10,000 – 19,999
3. ☐ 5,000 – 9,999
4. ☐ 2,500 – 4,999
5. ☐ 1,000 – 2,499
6. ☐ 500 – 999
7. ☐ 499 or less

8. Please Indicate the Internet/Intranet/LAN/WAN products/services that you are currently involved in purchasing or plan to purchase (check ALL that apply)

A. Currently involved in purchasing B. Plan to purchase

INTERNET/INTRANET

A B
☐ 01. ☐ VPN Equipment
☐ 02. ☐ VPN Services
☐ 03. ☐ Firewalls/Security/Encryption
☐ 04. ☐ Electronic Commerce
☐ 05. ☐ Web Servers/Software
☐ 06. ☐ Web Enabled Call Center Tools
☐ 07. ☐ Voice/Video Over IP (IP Multicast Routing)
☐ 08. ☐ Internet Services
☐ 09. ☐ Web Hosting
☐ 10. ☐ Host Access
☐ 11. ☐ Web Development Tools
☐ 12. ☐ Management/Monitoring Software
☐ 13. ☐ Web Based Management Tools
☐ 14. ☐ Web Based Collaboration/Groupware
☐ 15. ☐ Caching/Load Balancing Products
☐ 16. ☐ Other Internet/Intranet

LOCAL-AREA NETWORKS/INTERNETWORKING

A B
☐ 17. ☐ Local-Area Networks
☐ 18. ☐ Network Operating System Software (NOS)
☐ 19. ☐ Intel Based Servers
☐ 20. ☐ Intel Based Multiprocessor Servers
☐ 21. ☐ RISC Based Servers
☐ 22. ☐ Clustered Servers
☐ 23. ☐ Print Servers
☐ 24. ☐ Routers
☐ 25. ☐ Layer 2 Switches
☐ 26. ☐ Layer 3 Switches
☐ 27. ☐ Layer 4 Switches
☐ 28. ☐ ATM Switches
☐ 29. ☐ Token-Ring Switches
☐ 30. ☐ Network Storage (NAS, SANs)
☐ 31. ☐ Storage/Backup (Optical, Disk, Tape, RAID)
☐ 32. ☐ Network Test/Diagnostic Tools
☐ 33. ☐ UPS
☐ 34. ☐ Network Interface Cards (NICs,PCMCIA)
☐ 35. ☐ Hubs/Intelligent Hubs/Stackable Hubs
☐ 36. ☐ Cables,Connectors, Baluns
☐ 37. ☐ SNMP Platform
☐ 38. ☐ Management Frameworks
☐ 39. ☐ Other LAN/Internetworking

WAN EQUIPMENT & SERVICES

A B
☐ 40. ☐ Modems
☐ 41. ☐ Cable Modems
☐ 42. ☐ Asynchronous Transfer Mode (ATM)
☐ 43. ☐ Frame Relay Equipment Including FRADS
☐ 44. ☐ Frame Relay Services
☐ 45. ☐ Remote Access Products
☐ 46. ☐ Remote Access Services
☐ 47. ☐ Wireless Data Equipment/Services
☐ 48. ☐ ISDN Equipment/Services
☐ 49. ☐ FT-1/T-1/T-3 Services
☐ 50. ☐ xDSL Services/Products
☐ 51. ☐ Diagnostic/Test Equipment
☐ 52. ☐ DSU/CSU
☐ 53. ☐ PBXs
☐ 54. ☐ Videoconferencing
☐ 55. ☐ Managed LAN/Router Services
☐ 56. ☐ Fax Servers/Services
☐ 57. ☐ Other WAN Equipment/Services

None of the above (1 - 57) A ☐ 58. B ☐

9. Please indicate the Network hardware/software/services that you are currently involved in purchasing or plan to purchase: (check ALL that apply)

A. Currently involved in purchasing B. Plan to purchase

COMPUTERS/PERIPHERALS

A B
☐ 01. ☐ Laptops/Notebooks/PDAs
☐ 02. ☐ PCs
☐ 03. ☐ Windows Terminals/Thin Clients
☐ 04. ☐ Workstations
☐ 05. ☐ Storage/Backup (Optical,Disk,Tape,RAID)
☐ 06. ☐ Printers
☐ 07. ☐ Printer/Fax/Copier Hybrids (Multifunction Printers)
☐ 08. ☐ Minis
☐ 09. ☐ Mainframes
☐ 10. ☐ Fax/Modem Boards
☐ 11. ☐ Memory/Chips/Boards/Cards
☐ 12. ☐ Other Computers/Peripherals

SOFTWARE/APPLICATIONS

A B
☐ 13. ☐ Network Management
☐ 14. ☐ Systems Management
☐ 15. ☐ Security
☐ 16. ☐ Directory Services
☐ 17. ☐ Operating Systems
☐ 18. ☐ Applications Development Tools
☐ 19. ☐ Database Management/RDBMS
☐ 20. ☐ Groupware
☐ 21. ☐ E-Mail
☐ 22. ☐ Enterprise Resource Planning (ERP)
☐ 23. ☐ EDI
☐ 24. ☐ Desktop Videoconferencing
☐ 25. ☐ Imaging
☐ 26. ☐ Middleware/Serverware
☐ 27. ☐ Document Management
☐ 28. ☐ Site Metering Tools
☐ 29. ☐ Data Warehousing
☐ 30. ☐ Anti Virus Software
☐ 31. ☐ Multimedia
☐ 32. ☐ Y2K Conversion Software
☐ 33. ☐ Helpdesk
☐ 34. ☐ Other Software/Applications

SERVICES

A B
☐ 35. ☐ BPO (Business Process Outsourcing incl. Financial Services, HR, Logistics etc.)
☐ 36. ☐ Applications Outsourcing
☐ 37. ☐ Call Center Outsourcing
☐ 38. ☐ Systems Integration/Consulting
☐ 39. ☐ Education/Training Services
☐ 40. ☐ Other Services

None of the above (1 - 40) A ☐ 41. B ☐

10. Please indicate the platforms that are currently installed/planned: (check ALL that apply)

A. Currently installed B. Planned for purchase

NETWORK PROTOCOLS

A B
☐ 01. ☐ TCP/IP
☐ 02. ☐ IPv6
☐ 03. ☐ SNA
☐ 04. ☐ Novell IPX/SPX
☐ 05. ☐ APPC/APPN/LU 6.2
☐ 06. ☐ NETBIOS/NETBUEI
☐ 07. ☐ NFS
☐ 08. ☐ SNMP
☐ 09. ☐ Other Network Protocols

LAN/WAN ENVIRONMENT

A B
☐ 10. ☐ Gigabit Ethernet
☐ 11. ☐ Switched Ethernet
☐ 12. ☐ Fast Ethernet
☐ 13. ☐ Ethernet
☐ 14. ☐ ATM
☐ 15. ☐ Token Ring/Token Ring Switching
☐ 16. ☐ IP Switching
☐ 17. ☐ Layer 3,4 Switching
☐ 18. ☐ FDDI
☐ 19. ☐ 100Base-T
☐ 20. ☐ 10Base-T
☐ 21. ☐ Fibre Channel
☐ 22. ☐ Wireless
☐ 23. ☐ DSL
☐ 24. ☐ ISDN
☐ 25. ☐ Frame Relay
☐ 26. ☐ Private Line T1, T3, FT-1, SONET
☐ 27. ☐ Other LAN/WAN Environment

NETWORK OPERATING SYSTEM

A B
☐ 28. ☐ Windows NT/Windows 2000
☐ 29. ☐ Novell (NetWare 5.X)
☐ 30. ☐ Novell (NetWare 4.X)
☐ 31. ☐ Novell (NetWare 2.X,3.X)
☐ 32. ☐ LINUX
☐ 33. ☐ Microsoft (LAN Manager)
☐ 34. ☐ Banyan (Vines)
☐ 35. ☐ IBM (LAN Server)
☐ 36. ☐ Other Network Operating System

COMPUTER OPERATING SYSTEM

A B
☐ 37. ☐ NT Workstation
☐ 38. ☐ Windows 2000
☐ 39. ☐ Windows 98/95/3.1
☐ 40. ☐ Intel based UNIX
☐ 41. ☐ RISC based UNIX (incl. SOLARIS)
☐ 42. ☐ LINUX
☐ 43. ☐ DOS
☐ 44. ☐ OS/2,OS/2 WARP
☐ 45. ☐ OS/400
☐ 46. ☐ IBM MVS/VM/VSE/ESA
☐ 47. ☐ Digital VMS
☐ 48. ☐ Macintosh
☐ 49. ☐ Other Computer Operating System

None of the above (1- 49) A ☐ 50. B ☐

11. Which of the following hardware platforms are installed/planned in your company?
(check ALL that apply)

A - Mainframes (Large Scale)
1. ☐ IBM
2. ☐ Other

B - Minis (Midrange)
1. ☐ IBM RS/6000
2. ☐ IBM AS/400
3. ☐ Digital/Tandem/Compaq
4. ☐ Unisys
5. ☐ H-P
6. ☐ Other

C - Workstations
1. ☐ Sun Microsystems
2. ☐ H-P
3. ☐ Digital/Compaq
4. ☐ IBM
5. ☐ Silicon Graphics
6. ☐ Other

12. What Is the estimated gross revenue of your entire company/institution?
(check ONE only)

1. ☐ $20 Billion or More
2. ☐ $10 Billion to $19.9 Billion
3. ☐ $1 Billion to $9.9 Billion
4. ☐ $500 Million to $999.9 Million
5. ☐ $100 Million to $499.9 Million
6. ☐ $50 Million to $99.9 Million
7. ☐ $10 Million to $49.9 Million
8. ☐ $5 Million to $9.9 Million
9. ☐ $4.9 Million or less
10. ☐ None of the above

13. For which areas outside of the US do you have purchase influence?
(check ALL that apply)

1. ☐ Europe
2. ☐ Asia
3. ☐ South America
4. ☐ Australia
5. ☐ Middle East
6. ☐ Africa
7. ☐ Canada
8. ☐ None

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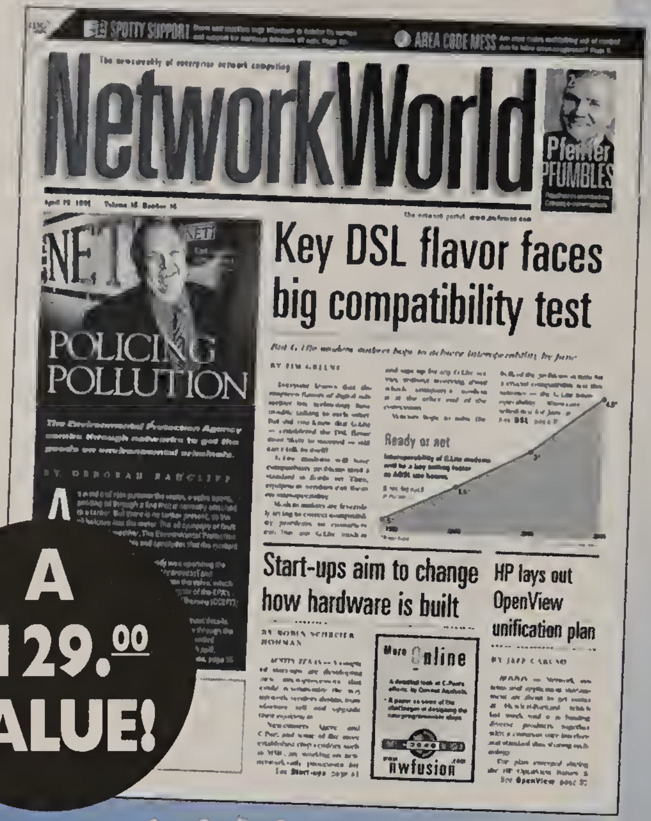
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The NEW economy

THE INTERNET'S RISE HAS WROUGHT POWERFUL CHANGES ON THE NETWORK INDUSTRY. BY SUSAN BREIDENBACH

Industry experts keep trying to position the Ciscos, Lucents and Nortel Networks of the network industry as the last, unseatable emperors, and the market keeps proving them wrong. As an incredible round of initial public offerings (IPO) by network vendors in the past six months shows, the Internet economy isn't just about dot-com ventures gaining astronomical valuations through what looks suspiciously like smoke and mirrors.

Even in the network infrastructure market, start-ups have never had it so good.

Look at the successful IPOs of network product companies such as Juniper Networks and Copper Mountain Networks. Juniper, which makes Internet backbone routers, closed its first day of trading at $97.88 per share, or 188% over the $34 offering price. Copper Mountain, which makes digital subscriber line (DSL) products, closed its offering day at $68.44, or 226% over its $21 asking price.

What is the Internet economy bringing to late '90s network companies that counterparts formed earlier this decade or before didn't benefit from? For one, it levels the playing field by imposing standards and providing easy access to markets and resources. That increasing competitiveness, in turn, speeds the rate of innovation and gives greater advantages to nimble start-ups. Now established players use start-ups as external laboratories, often providing seed money, and buying them outright if they succeed.

In fact, within the big companies, it's getting harder and harder to distinguish R&D from M&A.

"It's a natural cycle, and it's a very positive thing," says Jim Flach, a partner at Accel Partners, a venture capital firm in Palo Alto. Start-ups have ultrasharp focus and complete dedication, and they spend a much higher percentage of their total budgets on R&D. Once they have products, they get bought and leverage the distribution power of the acquiring company.

"The big company gets the product and technology and, for a short time, the people. Then the people start the next new thing," Flach says. The result: New technology makes its way into the market much faster.

BRAIN DRAIN

This trend feeds upon itself as start-ups become rallying points for the best and brightest. College graduates no longer set their sights on the big names in networking. They want to create a hot start-up and become the next Marc Andreessen.

In Cisco's salad days, start-ups had to earn their valuation the hard way, by racking up several quarters of solid earnings before going public. The company got its start when Sequoia Capital gave it $2.5 million — a whopping sum in the mid '80s but mere pocket change these days. Its IPO produced a market cap of $225 million, but Cisco didn't go public until it had achieved $6.1 million in cumulative profit for the previous four quarters.

"Today, capital markets are willing to finance companies that are still losing money, as long as they are growing fast and going after big markets," says Amnon Shohan, principal partner with Cedar Fund, a venture capital firm in Tel Aviv. "Valuation is based on revenue growth, not earnings per share. And because Wall Street is rewarding start-ups the way it is, start-ups can attract the best talent."

The result is a brain drain that is making big companies distribution-rich and product-poor. "That's why the bulk of new products the big guys have been introducing are the result of acquisitions," Flach says.

Traditional network companies are also hindered by the large installed bases they've spent years culti-

ILLUSTRATION: BILL SCHWARTZ

vating, for in the Internet economy, a big installed base is very much a mixed blessing. While one can help buffer an established player from rapid change, it also can create some disadvantages for economies of scale.

THE 'NET'S IMPACT

The rise of the Internet economy has affected the network business in many ways. The Internet economy:

- Levels the playing field by imposing standards and providing easy access to markets and resources.
- Speeds the rate of innovation and fosters cross-pollination of technology development.
- Gives greater advantage to nimble start-ups than to established companies that have to contend with big installed bases.
- Creates an environment in which start-ups are viewed as external R&D facilities for established vendors.
- Places extraordinary valuations on start-ups with unproven histories.
- Keeps vendors more in tune with business needs because young companies growing up in this new economy are making decisions closer to the customers.

"The big companies have customers they have to bring along and product trajectories that can be difficult to revector," says Russ Siegelman, a partner with venture capitalist star Kleiner, Perkins, Caufield & Byers in Menlo Park, Calif. While start-ups have only windshields, larger companies have much bigger rear-view mirrors, which they are constantly checking. They have less time to look at where they are going and respond to market changes. They also face new R&D challenges.

"Large groups of people have two problems: They don't move fast, and they can't innovate," says Cliff Higgerson, a partner with ComVentures, a venture capital firm in Palo Alto. It's hard to design products by committee, and the pace of technology change makes the process even more difficult.

"Size does not carry anything like the momentum that it used to," says Peter Alexander, vice president of enterprise marketing for Cisco. And Cisco's size has increased from 4,000 employees in 1995 to more than 23,000 today.

Big companies' customers are being pursued relentlessly by newcomers such as Vertical Networks, a Sunnyvale, Calif., start-up that is using $55 million in venture backing to develop its InstantOffice line in the emerging voice/data switch market.

"The big companies are dealing with a lot of legacies, which restrict the kind of infrastructure you can build and limit the kind of partnerships you can form, and sometimes force you to eat your young," says Alan Fraser, president and CEO of Vertical. "What you have, you kind of have to stick to and not destroy. Existing relationships can hinder you from thinking about new ways of doing business."

Start-ups keep the network industry more in tune with business needs because they are making decisions closer to the customers. The level of participation by customers in the product development process is much higher.

"As a start-up, you spend more time with early adopters, and they almost envelop you and bring you in," says Gordon Payne, executive vice president of sales, marketing and operations for Tundo Corp., a venture capital-funded pioneer of packet-based telephony. "Your success is their success." That said, start-ups do have to guard against over-customization and keep their sights on products and services that can be sold to a sizeable customer base.

CATCHING THE WAN WAVE

If the enterprise market is good to start-ups, the service provider arena is even better.

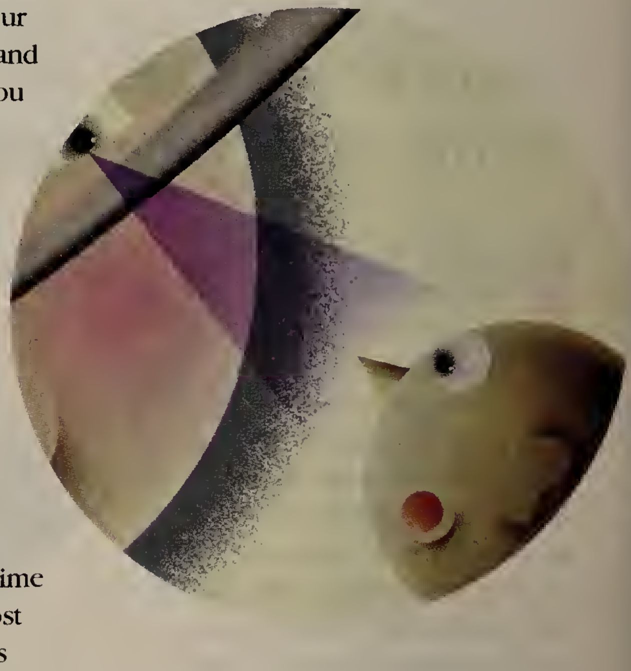
"Service providers are so desperate to get leading-edge capabilities that they will trial with anyone," reports Michelle McLean, director of strategic marketing for Pluris, a start-up in Cupertino, Calif., that is developing terabit routers for service providers. Pluris has attracted $60 million in venture funds.

While service providers make technology decisions, McLean says, enterprises make business decisions. Technology is third or fourth on an enterprise buyer's list. Enterprises are conservative and more reluctant to buy from emergent companies.

It wasn't always this way. During the LAN revolution, enterprises were the infrastructure sweet spot, and carriers were the bastions of conservatism. Carriers took too long to make up their minds, depreciated equipment over 20 years and were under less competitive pressure to adopt new technology.

"Deregulation has created an explosion of new carriers that are a lot more likely to buy from start-ups," Higgerson says. "And now the established carriers are forced to keep up and are more receptive to buying from smaller companies."

At the same time, carriers are more demanding and risk-averse than enterprises because their network infrastructures are much more closely tied to revenue streams. It's a measure of the competitive pressure they are under that they are opening the door to start-ups.



Industry watchers point to three waves that are breaking over the network infrastructure market and forcing the issue: the transition of tens of billions of dollars in circuit-switched equipment to packet technology; the deregulation that has spawned legions of carriers that are themselves start-ups; and all the green-field opportunities in less-developed countries.

"There is an enormous sucking sound all over the world from people who want to buy this equipment," says John Boyle, a general partner with Worldview Technology Partners, a venture capital firm in Palo Alto. "We have international carriers coming to us, asking to be hooked up to our start-ups, saying, 'We can't get their attention.'

"It's a spectacularly unique situation to have three waves like this coming together at the same time," he adds.

Meanwhile, the enterprise market is stronger than ever, but it looks anemic by comparison. There hasn't been the same infrastructure shift that the Internet economy's open systems thrust on

Continued on page 22 ➡

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ared to infants bathed at four hours
owever, it is possible that
occurred occasionally in our
have predisposed neonates to

midwives became more conscious of
each delivery for one individual
whose responsibilities are solely
newborn infant, one of the stated
of the NRP. Prior to the introduction
RP, there had been nine occasions
one nurse-midwife, responsible for
mother and her newborn infant, was
a delivery. This situation occurred
in the posttraining period. We believe
in practice came about because of
ned awareness among midwives of
for a specific individual to be present
mediate care of each newborn infant at
ent of birth.
the NRP training, there was a
ing the more frequent use of free-flow
bag and mask ventilation; this was
related to better evaluation of the
The higher (although not significant)
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Continued from page 20

the carrier market. The existing enterprise infrastructure has turned into a commodity and become relatively standard across vendors. There are almost no green-field opportunities, and manufacturing efficiencies and economies of scale have become more important. Consequently, start-ups don't bring as much to the table.

THE INTERNET ADVANTAGE

The Internet favors start-ups in many ways. "It is an information economy that is pushing power out to end users, to individual consumers," says Ajit Medhekar, president and CEO of Lara Technology, a San Jose start-up developing carrier-class voice products that use IP instead of ATM or SONET in the service provider core. "It's becoming more of a pull than a push economy, so the big players have less of an advantage."

The Web provides easy and inexpensive access to information, so new companies can become known much more quickly around the world, and attract that critical mass of first customers a lot faster. The Internet also fosters a lot more cross-pollination of technology development.

PHOTO: BRAD MILLIKEN/MPG

Accel Partners' Jim Flach says the big boys keep up with the latest technology by acquiring start-ups.

"There is no monopoly on good ideas anymore," says Bill Hawe, chief technology officer for Nortel in Billerica, Mass. "There used to be a lot of compartmentalization of information. The Internet economy broke that down, and everything is connected in a single bazaar."

This free flow of ideas is benefiting the big companies, too. "We are now seeing a lot of things starting up in big companies that would ordinarily be funded by venture capitalists," Hawe says. He offers as proof three products Nortel introduced for the service provider market this year: the Versalar 15000 multiservice switch for the edge of service provider networks, and the Versalar 25000 and Optera Packet Solution series of optical switches for service provider cores.

"These products were started in an incubator within Nortel," Hawe says.

In general, though, the Internet lets companies focus on what they do best and outsource everything else. Start-ups typically have great focus, so they are a better fit for this new value-chain paradigm. They can become major players a lot faster by creating partnerships and using extranets to create virtual companies that have all the capabilities of big, traditional enterprises.

The advantage start-ups have is their ability to operate in Internet time.

"Because of the speed and changes, companies make decisions that may not be fully informed and checked,

Continued on page 24

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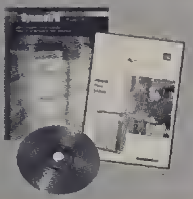

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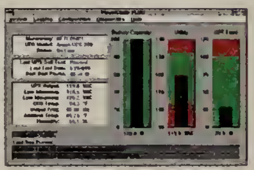

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Continued from page 22

and they have to be able to absorb any resulting mistakes," Cedar Fund's Shohan says. "It's harder for big organizations to operate this way."

It's not impossible though, insists Cisco's Alexander.

"The Internet economy has skewed the market in favor of companies that display superior agility, but agility does not have to be a function of size," he says. Properly applied, "I-business" can optimize the communications, productivity and costs of the industry behemoths, too. Because of the Internet, Cisco executives have an up-to-the-minute picture of customers and their needs, and can make decisions quickly.

Cisco even has a self-assessment test called the Internet Quotient that other companies can use to measure their potential to create an "Internet ecosystem" and leverage it. Available to the public, the interactive test can be found at www.cisco.com/warp/public/750/indicator/quiz.html.

"The secret going forward is to scale agility," Alexander says. Companies that do so — even big players — can continue to grow their market caps rapidly and offer new recruits and investors returns similar to those of start-ups.

And an acquisition strategy is a lot less risky than developing everything in-house. People often ask why Cisco pays $200 million for a technology that could have been developed internally for $10 million. But they are forgetting that this acquisition approach lets the venture capitalist community absorb a lot of the risk — the 19 out of 20 start-ups that fail. Cisco can wait and buy the one that succeeds.

"That's how the established players retain and expand power today, by buying the innovators after the pudding has been proven," says William Schrader, chairman and CEO of Internet backbone giant PSINet in Herndon, Va. The pressures of the Internet economy have made the big companies so desperate for cutting-edge technology that they will pay whatever it takes.

The start-ups acknowledge the lure of buyout offers makes it difficult.

"We want to stay independent and become the next Cisco, but we have no control over whether someone comes along and offers so much that our owners say, 'Take it,'" Vertical's Fraser admits.

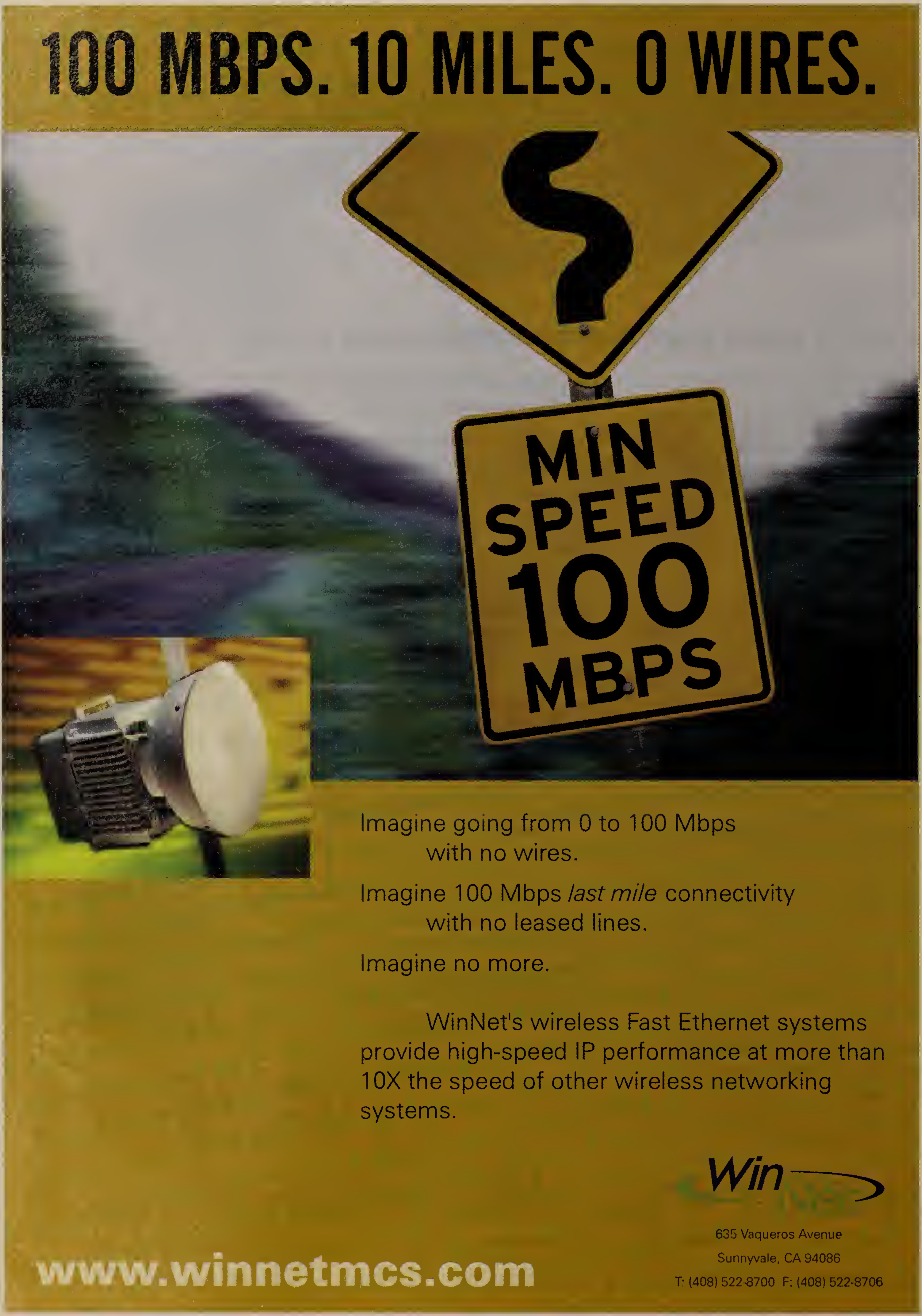
And the venture capitalists admit confidentially that it is not unheard of for major customers to force the issue by agreeing to buy a product only if the start-up in question becomes a unit of a bigger company with which the user organizations are already dealing.

Start-ups that evade suitors and make it through a successful IPO face new obstacles. "They have the toughest job," Alexander says. "They have their market cap, and now they have to prove they are worth it by staying on track with revenue growth. There is less upside for new hires because the big boost has already gone by."

The secret to maintaining independence is having a value proposition so compelling that large customers can't live without it. As Lara's Medhekar puts it, this proposition "has to be something radical with a reasonable possibility of success." A better mousetrap that provides an incremental improvement over what the Ciscos and Nortels can offer won't suffice.

Start-ups have to make a quantum leap forward in a product category or, better yet, invent a brand-new one.

Breidenbach is a freelance technology journalist and consultant. She can be reached at sbreidenbach@usa.net.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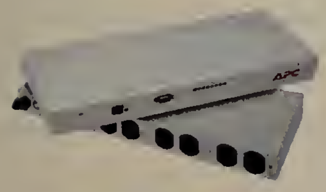

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Power prognosticator

OUR CRACK EDITORS PREDICT WHAT TECHNOLOGIES (AND BUSINESS TRENDS) WILL REIGN SUPREME.

ILLUSTRATION: CHRIS PYLE

So 2000 is finally here. All the yapping, all the hoopla, and for what? Just another year on the calendar? Another year closer to The End?

Well, perhaps things won't get that dramatic in the network industry, but this year will be full of surprises. And while it's always dangerous to predict the future, that's never stopped us before.

We've taken our best and brightest minds, stuffed them into a time warp and asked them to let you in on what to expect in the coming year.

They found that yes, customers will start to roll out Windows 2000, but that Active Directory will prove to be the "gotcha." IPv6 is closer to reality than you may think — and this will be a huge year for digital subscriber line service and wireless data. And you know how everyone's been bashing all those complex and expensive network and systems management platforms? Well, demand will jump this year for consolidation of point management products. What's more, the pace of mergers and acquisitions will continue unabated — not that that's really a good thing.

Read on for a glimpse into the year ahead.

Watch out for Active Directory

By John Fontana

The new year may be a good time to get out the survival gear, because the network operating system landscape in 2000 is likely to be littered with more dead and wounded than a special edition of a Marvel comic book.

What will so terrorize enterprise networks? It certainly won't be the lingering effects of the Year 2000 bug. It won't be NetWare, Solaris, Linux or any other Unix mutants.

Rather, the culprit will be Microsoft's Windows 2000, and for one obvious reason: Active Directory. This is not a slam against the directory technology, which has undergone a more rigorous beta-testing period than any product Microsoft has ever released. No, this is a comment on Active Directory's innate complexity.

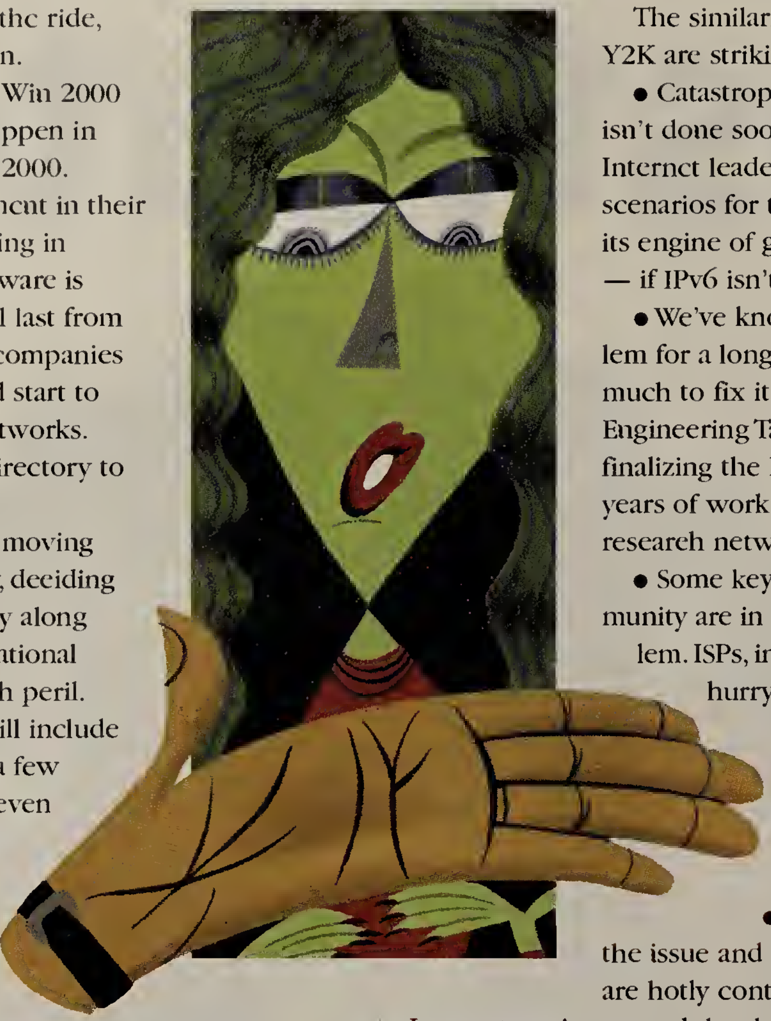
Active Directory leaves no room for error. Mess up on this technology, and you'll soon be watching the rest of your Windows 2000 deployment implode. Active Directory could truly prove to be kryptonite for the Supermen and Superwomen in your IT groups.

Just ask any Novell Directory Services (NDS) administrator about the challenges of rolling out an enterprise directory. Six years ago, these administrators struggled mightily when Novell first released its directory. Sure, Microsoft has probably learned a few things from watching Novell, but heaven help those who underestimate the effort it takes to deploy an enterprise directory. The only saving grace may be that while few NDS administrators enjoyed the ride, they love the destination.

Most analysts predict Win 2000 rollouts will begin to happen in earnest near the end of 2000. Enterprises will experiment in their labs and run pilots starting in February, when the software is released. Those tests will last from six to 10 months, then companies will take the plunge and start to exorcise existing NT networks.

But look for Active Directory to extend many pilots.

Even the first step of moving toward Active Directory, deciding to organize the directory along geographical or organizational lines, will be loaded with peril. The decision process will include enough politics to end a few careers. Things will get even tougher once you start dealing with forests, trees, organizational units and schemas.



Microsoft has already sent out an advisory warning customers and prospects that Active Directory deserves IT's undivided attention. The company has issued white papers, forged relationships with third-party developers and acquired technologies all designed to make the job of installing Active Directory and Win 2000 easier.

That being said, all you enterprise superheroes better be ready for a good fight.

IPv6: The new Y2K dilemma

By Carolyn Duffy Marsan

Forget Y2K. The next big fix for net managers to worry about is IPv6.

Just as companies are phasing out their private data networks and migrating everything to the Internet, they're finding out that the current version of the Internet Protocol — IPv4 — is running out of address space.

The shortage of Internet addresses is particularly keen overseas. Take China, for example. The world's most populous country has a smaller block of IPv4 address space than Stanford University. Even in the U.S., addresses are getting harder to come by as more people hook up their Palm Pilots and set-top boxes to the 'Net.

IPv6 solves this problem by replacing the 32-bit addressing scheme in IPv4 with 128-bit addressing, which allows for a virtually unlimited number of Internet addresses.

IPv6 has the makings of a news story that even the mainstream press can understand. In fact, CNN, the Associated Press and *The New York Times* have all run IPv6 stories in recent weeks. IPv6 will be the topic of choice for all those Y2K reporters once they've beaten that horse to death.

The similarities between IPv6 and Y2K are striking:

- Catastrophe may hit if the fix isn't done soon enough. Some Internet leaders are painting scary scenarios for the U.S. economy and its engine of growth — the Internet — if IPv6 isn't rolled out in time.
- We've known about this problem for a long time but haven't done much to fix it. The Internet Engineering Task Force (IETF) is finalizing the IPv6 standards after six years of work. However, only research networks are using IPv6.
- Some key members of the community are in denial about this problem. ISPs, in particular, are in no hurry to migrate to IPv6 even though they're the ones that need to sign up new Internet customers and dole out addresses.
- The seriousness of the issue and the best way to fix it are hotly contested. Respected Internet engineers and developers are on both sides of the IPv6 debate. Some recommend migrating networks to IPv6 as soon as possible, while others say IPv6 will never happen.
- Getting your network fixed will be time-consuming and expensive. Few commercial products are IPv6-compliant today, and hardly any tools are available to help you make the transition.

What will happen regarding IPv6 in the year ahead?

Get ready for more noise about the protocol. The IPv6 Forum is ramping up and will be creating a buzz about IPv6, as will the Internet engineering and user communities. Given that it's an election year and all the candidates are trying to attract high-tech campaign contributions, it's not that far-fetched to imagine congressional hearings on the status of the IPv6 migration.

Look for IPv6-compliant products to hit the market. Cisco is expected to ship a commercial version of its IPv6 software next year. The pressure will then be on Microsoft to support IPv6 in an upcoming release of Win 2000.

More tools for transitioning networks from IPv4 to IPv6 will come out of the IETF, whose latest prediction is that IPv6 will roll out first at the edge of the Internet — on corporate networks — and then the backbone will be upgraded.

My advice to network managers: Be ready to respond to questions about IPv6. If the buzz gets strong enough, be prepared for your CEO or shareholders to start asking questions about your strategy for migrating the corporate network to IPv6. And start squirreling away dollars now so you can afford the network upgrade if and when the time comes.

The year of DSL — no kidding

By Tim Greene

2000 is the year of DSL.

No, really.

Never mind that 1998 and 1999 were also supposed to be the years that digital subscriber line went mainstream. Indications are DSL services that transform phone lines into broadband access links will become widely available this year.

Consider this: America Online now has deals with Ameritech, Bell Atlantic and SBC to offer DSL services to AOL's Internet-access customers.

Separately, SBC has bet its future on the technology. It plans a $6 billion network upgrade that includes expanding its fiber network and linking customers to the fiber-over-DSL-enabled copper wires.

Upstart carriers are starting to offer new services over DSL lines that could not have been supported on traditional circuits. For example, carriers will offer a service that supports up to 15 telephone circuits as well as a broadband data stream on a DSL line for $400 per month.

In addition to local carriers' efforts, DSL specialists Covad, Northpoint and Rhythms NetConnections have agreements to wholesale DSL to national service providers such as AT&T, Frontier, Intermedia, PSINet, Qwest, Savvis and UUNET.

Modem makers also are ready to advance DSL. They are finally delivering DSL-lite modems that can be plugged into a DSL line without a visit from a service technician. That makes turning up DSL service easier and less expensive for everyone.

These DSL-lite modems are capable of 1.5M bit/sec downloads and will ship installed in PCs made by major computer vendors, such as Dell and Compaq. Customers won't have to buy a separate modem and hassle with installation.

The prices of DSL services have already dropped, in part because carriers don't need to temper demand with high prices any longer. The prices are also being kept in check by competition from cable modem services that offer broadband Internet access for less than $50 per month.

The bottom line is that in 2000, customers will be able to affordably buy DSL services and the equipment they need to support them.

And if it turns out that 2000 is not the year of DSL, then 2001 definitely will be.

No, really.

Wireless data is due

By John Cox

The explosion in handheld devices of all kinds will force companies in 2000 to deal with wireless connectivity on a scale unthinkable a year ago.

Continued on page 32

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Delivering a Better Internet

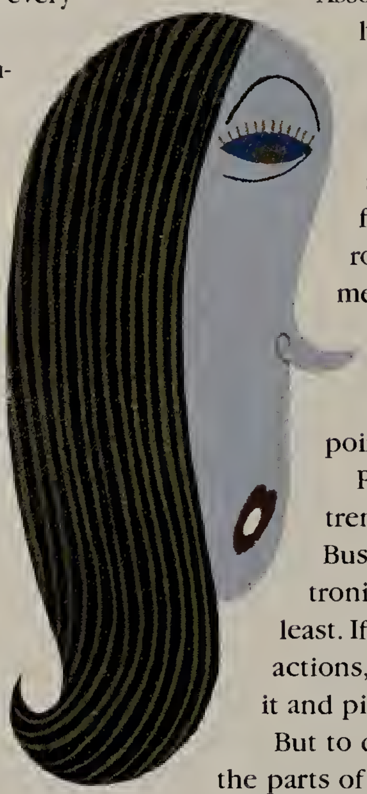
Continued from page 28

Three reasons stand out for why wireless technology will be a top priority for corporate IT groups in the coming year.

First, the number of devices in the hands of corporate users will continue to grow, and so will the variety of devices. Modern workers are stuffing everything from cellular phones with Internet access to interactive e-mail pagers and push-button handheld computers into briefcases and toolboxes or hanging them on belts.

Some companies are finding that people with no Windows PC experience at all can work almost at once with simply designed handheld applications. The real value of these devices is directly proportional to how easily and how extensively they can access or update corporate data.

Without such access, most of these devices will be just high-tech paperweights.



Second, telcos and other service providers are, or soon will be, rolling out wireless data services that are vastly faster and cover more territory than what's been available before. In some cases, users will have bandwidth that approaches corporate Ethernet LAN speeds. Wireless data until now has been hamstrung by low bandwidth and, as a result, its use has been limited to proprietary devices in niche markets, such as car rental agencies.

Third, handheld users will have access to information on the Internet. And if they don't have it, they'll demand it. Major providers such as Sprint and vendors such as Motorola have already launched huge advertising campaigns touting the wonders of using a handheld phone or similar device to work with Internet-based applications and data. It's a bit more complicated than that, and the consumer ads miss the point that the first and most productive use of wireless Internet access will be by corporate users. That's because the Internet creates a standard way to connect through corporate intranets and, through extranets shared with trading partners, to existing legacy applications as well as new electronic-business and e-commerce applications.

The result of these three trends will be costly chaos, unless IS groups do what they do best: Create an infrastructure that will let handheld users get on with their work.

Issues such as wireless security, network performance, application response time, carrier quality of service and application integration will be more important than ever in 2000.

The return of multi-purpose management software

By Jeff Caruso

Get ready for a new twist in the ongoing power struggle between management software platforms and point products.

The question has been: Do IT managers want an all-encompassing framework into which all of their management software can fit nicely, or do they want individual tools that solve specific problems?

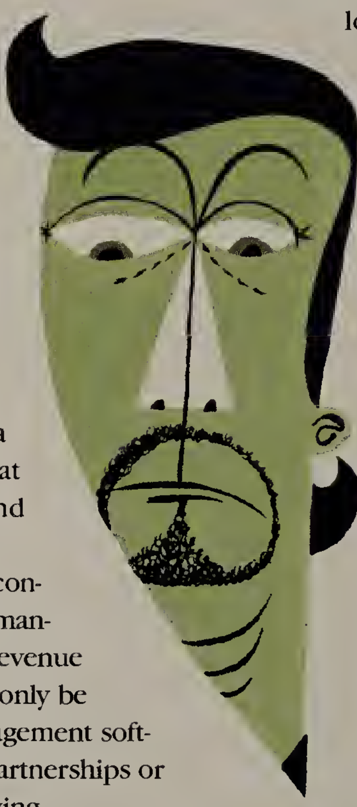
Last year at this time, the momentum was solidly behind the point tools. IT managers slammed platforms and frameworks from the likes of Computer Associates and Tivoli, bemoaning their high price tags and implementation headaches. So the industry went back to basics. We saw hundreds of point tools from a host of start-ups and established players fulfilling useful — but also narrowly defined — roles, such as performance management, reporting and event correlation.

This year, expect the pendulum to swing the other way toward consolidation of these point products.

Part of the reason for the shift is the tremendous growth of e-business. Business transactions conducted electronically can be complex, to say the least. If there is a problem with such transactions, an IT manager has to know about it and pin down the problem's source.

But to do so, the manager has to see all the parts of the transaction — including what's happening on the servers, on the network and in the applications. Point tools often provide small windows into parts of the network and systems involved, but they don't give the whole picture.

Traditional frameworks have claimed to provide the whole picture for years, but they haven't really delivered. The idea now is to grab the point tools that do well at individual functions and tie them together.



Another reason for impending consolidation is the sheer number of management products out there. The revenue pie for management software can only be sliced so thin before you see management software start-ups looking for major partnerships or acquisitions to keep revenue growing.

The whole move toward consolidation is creating a market for products that stretch across other products. For instance, if you have more than one management platform or multiple tools, some companies will sell you software to pull together the data collected by those offerings and put it in one place.

The Common Information Model, a standard way of representing management data, should accelerate the consolidation. It is supposed to make it easier to tie different tools together because any tools that support the standard would have access to the same data in the same format.

There is a lot of potential out there for making IT management software more powerful than it has ever been. It will be interesting to see whether all this potential actually results in tools that IT managers have sorely needed for so long.

"I seen my opportunities and I took 'em"

By Michael Cooney

"WorldCom buys Southwestern Bell Atlantic's AT&T division for $4 trillion."
— probable *Network World* headline, circa 2002

Mergers and acquisitions. Good or evil?

I'm gonna have to come down on the side of evil on this one. I mean, where else can you find audacity like two behemoths such as MCI WorldCom and Sprint merging and having the gall to say the move is going to increase competition? Carriers make this leap in logic all the time and they know that basically no one's going to stop them.

It's evil, I tell you. Did you think evil was going to show up in a bunny suit making everyone feel good — then strike when no one is looking? No, evil is in your face, daring you to do something about it.

That's the rub. There isn't much anyone can do about it — nor should they. Oh, the FCC may take some shots at MCI WorldCom/Sprint, but the reality is — here's my first prediction — those companies will be one by the end of 2000.

Mergers are also a fact of life in the industry. In order to grow fast, companies can no longer take a long time with internal R&D. Vendors have to buy other companies' technologies. Internet time waits for no one. And those are just a couple of the reasons why the run on mergers and acquisitions is going to continue with a vengeance this year.

Who will we say goodbye to in 2000?

Cabletron and Newbridge Networks for starters. Both have been struggling for a while and both have been on the chopping block. They'll be snapped up by the likes of Alcatel or Siemens by midyear.

3Com could find itself beholden to some other vendor. It too could be swallowed up by a European company looking to gain a stronger presence in the U.S. market.

On a global level, Global One and Global Crossing could be gone by year-end. Global One has just had too many problems. And when Sprint is officially gobbled up by MCI WorldCom, well, the party's over. And sources tell me Global One wants to grow, but its assets might be too great for some carrier not to try to acquire.

Also expect AT&T to buy British Telecom outright. Sources say this deal will happen despite AT&T's already cozy relationship with the firm.

On a more local level, something has to give with BellSouth. Will it buy or be bought? Sources indicate the company will be bought, maybe by midyear.

There are too many folks in the application service provider arena for them all to survive. I don't want to pick on anyone in particular here, but look for some consolidation in this market.

George Washington Plunkitt, a character in William Riordan's *Plunkitt of Tammany Hall,* said: "I seen my opportunities and I took 'em."

Such would be a good theme for the mergers and acquisitions market in 2000. ■

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A hearty plate of deal making

We sent roving reporters to two epicenters of power lunching, and the high-tech deals were sizzling.

A TASTE OF A SILICON VALLEY POWER EATERY

BY JEFF CARUSO

A recent Monday finds me lunching at Il Fornaio in Palo Alto, Silicon Valley's favorite venue for the power lunch. This pleasant little Italian eatery is crawling with tech folks, and most of them are angling for a job.

Take the two gentlemen seated to my right. It's not a formal job interview — just the first, size-each-other-up step. The apparent interviewee is expressing his dissatisfaction with his current employer and tells his lunch partner, "I'm exploring other opportunities." The interviewer pushes him a folder emblazoned with the Sybase logo, and the interviewee leafs through it while polishing off his Insalata del Fornaio (a kind of Caesar salad with massive croutons).

Meanwhile, the women seated behind me are sipping iced teas and chatting about a friend who recently took a job at Lucent, only to be disappointed when the funding for his division didn't materialize. At another table, a man contemplates a career shift — he says he'll take a month off to decide. Seems everyone in the Valley is ready to flee to another job. And who can blame them, when high-tech personnel are in such ludicrously high demand here?

A couple of tables away is a larger group, several suits ganging up with a pitch aimed at a guy in khakis and a denim shirt. I see him listening intently to a slick-haired marketing type and scribbling on a yellow notepad. He's probably an industry analyst, or even (egad!) a high-tech reporter.

They'll let anyone into this place, I think as I lean out of my chair, trying to read the company name on the presentation slides. Does that say "STLS,"or is it "STIS?"

I never did find out, but here are a couple of tips. First, if you want to do business in Silicon Valley, you've got to check out Il Fornaio. And secondly, try the tiramisù — it's most excellent. ■

A LEGAL POWER TRIP IN BOSTON

BY NEAL WEINBERG

No respectable power lunch in the Boston area can take place without a hearty bowl of chowdah, that milky broth thick with clams from the sea floor and potatoes from the Maine soil.

And the place to get chowdah — or chowder as it's pronounced outside of New England — is Legal Sea Foods in Cambridge. I found plenty of wheeling and dealing going on there one recent chilly afternoon.

At one table, three Generation X-trepreneurs are passing contracts back and forth, chatting about IPOs and squinting into their cell phones to see if the numbers flashing on their displays are from people worthy of callbacks. The answer in all cases: 'No.' Dressed in post-Labor Day casual business attire — black and charcoal gray are all the rage — they do the deal, eat lobster salad rolls and swap airline horror stories.

Nearby, members of a more boisterous crowd blissfully ignore one of the prime manifestoes of power lunching — skip the alcohol. Chardonnay seems the beverage of choice for these diners, one of who sounds eerily like actor Joe Pesci. At one point, he bellows: "If you're spending a hundred million dollars, Jesus H. Christ, use your head!"

Of course, these days, thanks to the cell phone, one can conduct business while dining solo. Sure enough, off in the corner, a gentleman formally attired in white shirt, tie and dark suit hunches over his baked scrod, intently discussing business between bites.

Legal's isn't the only place where power lunches occur in the Greater Boston area. The previous day, at Blue Ginger, an eclectic eatery in upscale Wellesley, cell phones rang and pagers buzzed at most tables, while parties drank hot and sour pumpkin soup and nibbled on Mandarin chicken salad with crispy rice noodles. At one table, two men intently debated the merits of digital subscriber line service as a solution to the bandwidth problems they were having at their health care facility.

In Boston, you can power lunch in an upscale neighborhood — but never, ever pour ketchup on lobster. ■

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Dining tips for the power-minded.

BY JULIE BORT

While real estate magnates schmooze on the golf course and stockbrokers win new clients on the racquetball courts, people in the network business say the proverbial power lunch is still the best venue for cooking up deals. After all, technical people rarely stop working except to eat and sleep, and you can't sign a contract in your sleep.

But not every lunch is powerful. If you want to convince that brilliant network engineer to come work for you or get that venture capitalist to review your business plan, you've got to know the rules. The first is picking the right eatery.

To make an impression in the Valley, for instance, no place beats a Menlo Park or Palo Alto address for business lunching. These enclaves are close to numerous business parks, including the campuses of Hewlett-Packard and Sun. They're also near Stanford University and its prestigious business school, as well as a bevy of venture capital firms.

Top on any list is Palo Alto's Il Fornaio, an Italian restaurant frequented by the who's who in networking. Cisco execs love hanging out there, says Amy Hughes, a corporate spokeswoman. Or, when the network elite tire of Il Fornaio, they head to Scott's Seafood Grill and Bar, also in Palo Alto, or over to neighboring Menlo Park to dine at Chantilly II, Sprago or Zibibbo.

To scope out Stanford talent, try the Blue Chalk in Palo Alto, says Servane Briane, the Silicon Valley guide for Internet portal About.com. "The business school is where you want to network. Here is where the next venture capitalists are coming from," she says.

On the other coast, in the Boston area, Cambridge is the place the technical crowd and venture capitalists do their power lunching. No. 1 on the list of Cambridge power eateries? Legal Sea Foods — or as the locals say, Legal's.

Elsewhere in Massachusetts, Papa Razzi in Wellesley and the Green Papaya in Waltham make good choices, says Todd Dagres, general partner for Battery Ventures, a venture capital firm in Wellesley.

For the banking crowd, head into the city for a meal at Aujourd'hui (inside The Four Seasons Hotel), Julien (inside Le Meridien Hotel), the Bay Tower Room, Radius, Biba, L'Espalier or the Capital Grille, says Paige Brown, concierge team leader for Circles, a Boston-based company that provides concierge services to high-tech companies.

RULES TO LUNCH BY

The overriding rule when choosing a restaurant: Never make the 'burbs people drive into the city, and never make the city folk leave.

Also, consider what you want to accomplish. If it's important to impress your lunch mates with your personality, think out of the box. A new business-lunch trend in California is dining on unusual ethnic foods, such as Ethiopian cuisine, or even home-style American, at diners, About.com's Briane says.

If you're courting a busy venture capitalist or wooing a famous CEO to join your board, go for the power breakfast. It's faster — "power breakfasts force people to be brief," Battery Ventures' Dagres says.

The second rule: Skip the alcohol. While the two-martini lunch may have been the classic power gig in 1962, slamming down that much gin today is a major no-no. While a glass of wine is OK when lunching with co-workers, better to just say "No" at a power affair. Also off-limits are heavy meals, so make sure salads and soups are on the menu.

The third rule: Remember you're on stage. Much of your character is on display during a meal, Dagres says: "I won't look favorably on people who: 1) drink or smoke; 2) make me pick up the check; 3) have difficulty making a menu choice; 4) are rude or condescending to the wait staff — I used to be a waiter." ■

ts the stage for power lunching
while Legal Sea Foods (left)
to be if you're in the Boston area.

PHOTOS: JASON GROW; MICHAEL MCKEE (INSERT)

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THE 25 most POWERFUL PEOPLE IN NETWORKING

BY JULIE BORT, JIM DUFFY AND ANN SULLIVAN

As a fitting close to the decade in which really big things happened in networking (need we mention the Internet by name?), this year's list of the 25 most powerful people in networking is populated by personalities capable of big things.

People such as Bernie Ebbers and John Sidgmore of MCI WorldCom, Pat Russo of Lucent and Mike Volpi of Cisco forge the big buys. People like Bill Joy of Sun and Drew Majors of Novell have the big ideas that result in tangible, valuable products and technologies. People like the government's William Kennard and Thomas Penfield Jackson make the big decisions that can change the industry. People like Bill Friel of Prudential, John McKinley and Michael Wilson run the big, mission-critical networks we all watch for success or failure. And, of course, people such as C. Michael Armstrong of AT&T, John Chambers of Cisco and Bill Gates of Microsoft run the big, big companies on which networking rests today.

Their plans are grand, as are those of the other folks on our 25 most powerful people list — newcomers and old-timers alike. And so it behooves us all to pay attention to what they are up to in the world of networking. They are a powerful lot.

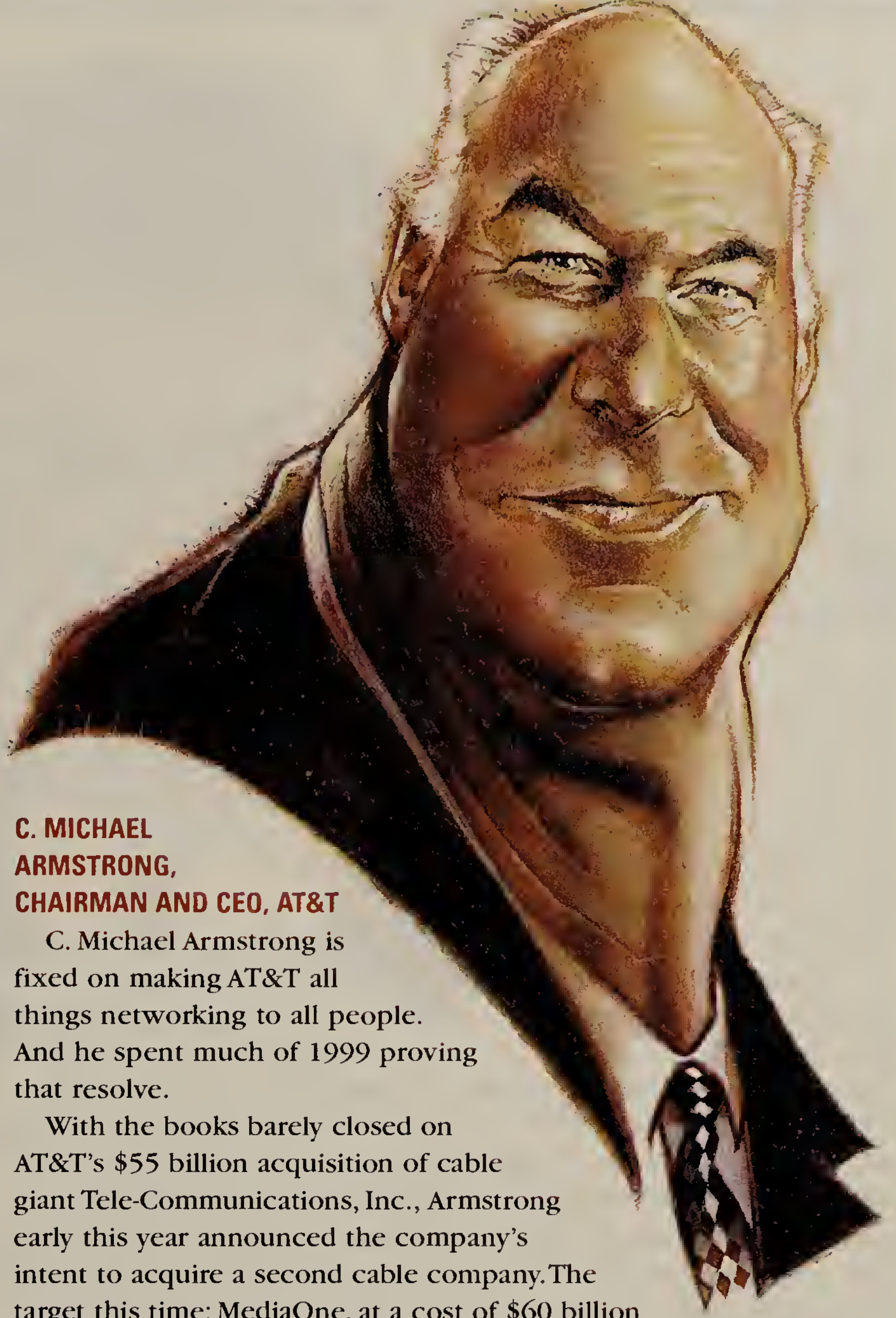


ILLUSTRATION: JAMES WAY

C. MICHAEL ARMSTRONG, CHAIRMAN AND CEO, AT&T

C. Michael Armstrong is fixed on making AT&T all things networking to all people. And he spent much of 1999 proving that resolve.

With the books barely closed on AT&T's $55 billion acquisition of cable giant Tele-Communications, Inc., Armstrong early this year announced the company's intent to acquire a second cable company. The target this time: MediaOne, at a cost of $60 billion or so. With TCI and MediaOne in its fold, AT&T will be able to reach out and touch 27% of all U.S. homes with high-speed cable access.

Microsoft, for one, seems impressed. It took hardly any time at all after the wraps came off the MediaOne deal for Microsoft to invest $5 billion in the carrier behemoth. As part of the deal, overall meant to strengthen the companies' ties in broadband and Internet services, AT&T will double the number of digital set-top boxes it deploys with Microsoft's Windows CE-based operating system to five million.

Of course, Armstrong's plans go well beyond cable and its largely consumer audience to date. He wants business users to think of AT&T as a local service provider, too.

AT&T's goal for 1999 was to offer local service in at least 15 new markets, bringing the number of cities covered to 98. It got a good chunk of local-loop facilities through its 1998 purchase of Teleport Communications Group, but Armstrong earmarked $2 billion this year for additional fiber build-out. That funding was part of a $6 billion investment that would also go toward bolstering AT&T's packet-voice position and blending its two Internet backbones.

Armstrong's aggressive moves aren't without baggage. ISPs are trying to force AT&T to open access to its newly acquired high-speed cable networks, and GTE filed an antitrust lawsuit against AT&T's cable unit.

Plus, all these acquisitions and expansions are a drag on AT&T's bottom line. Despite its expensive investments in cable, AT&T is still growing less quickly than the rest of the surging telecom industry. Also, AT&T's cable honcho, Leo Hindery, left the company. His departure casts a pall over Armstrong's ambitious cable plans.

Yet the world's biggest carrier steams full speed ahead on its course to offer businesses and consumers Internet access, and merged voice and data services over a single network that reaches across the U.S. and the globe. With Armstrong at the helm, others had best leave a wide berth.

FRED BAKER, CHAIRMAN, INTERNET ENGINEERING TASK FORCE

Fred Baker may be to the Internet what Alan Greenspan is to the stock market.

The Internet Engineering Task Force (IETF) is defining the standards, protocols and technical specifications for the next-generation Internet. As the 'Net becomes more pervasive in global business operations and more integral to the world's economy, the people steering the IETF's technical direction become intertwined with the success of companies doing business on the Internet. As IETF chair, that makes Baker a very important guy.

This past year has been a particularly challenging one for Baker (who is also a senior software engineer at Cisco). The IETF is vehemently opposed to new protocols on the 'Net that would let federal agencies intercept data and voice conversations. Baker is against the wiretap proposal for fear it would open all Internet traffic to interception, thereby posing security and intrusion risks.

The IETF continues to grapple with quality-of-service and voice/data convergence issues. Its work in these theaters, under Baker's direction, will determine whether the 'Net is ready for prime-time voice transmission or not.

Along with that, Baker earlier this year helped broker a truce between the IETF and the International Telecommunication Union that could help coordinate convergence standards work between the two organizations. The ITU has been around since the early days of voice networks, hammering out standards for plain old telephone service.

So just as Greenspan's words and deeds influence the stock market, so do Baker's actions affect the way companies do business on the 'Net. Is the 'Net ready to support the world economy? You'll have to ask Baker.

CRAIG BARRETT, PRESIDENT AND CEO, INTEL

Craig Barrett apparently recognizes that there's life beyond chips. In fact, the venerable Intel chieftain has led a bigger-than-ever network push this year. With the major strides Intel's made in networking in 1999, it looks to be well on its way to becoming a major network force for the Internet economy.

Under Barrett's guidance, the leading chip maker bought out gigabit switch vendor XLNT and remote access vendor Shiva, and released gigabit backbone switches, remote access routers and concentrators borne of those acquisitions, as well as network-specific processors. Barrett also recognizes the importance of virtual private networks (VPN) as a key product area for Intel. Continuing to take advantage of its Shiva acquisition, Intel is building integrated voice/data access devices that help companies carve out VPNs over the Internet or other networks.

And during an earnings call, Barrett revealed that Intel was entering the Web hosting business. Barrett expects to increase that business to support application services, as well.

On other fronts, Intel is collaborating with Compaq and Hewlett-Packard on next-generation server I/O specifications and has spun off a new division that will focus on business opportunities on the Internet. That division, called the Communications Product Group, will combine Intel's network hardware, systems management software and support activities into one area. The division will embrace Dialogic, the computer telephony equipment maker Intel acquired.

That makes two network divisions within Intel. The other is the Network Communications Group, which has responsibility for network component activities, such as the acquisitions of Level One and Softcom Microsystems. It also will manage Intel's foray into network processors, and the company's home networking and network adapter products.

And did someone mention e-commerce? Intel, which didn't start its own e-commerce effort until last year, now boasts $1 billion per month in online sales in 30 countries.

An Intel executive once said the company plans on being the building-block supplier to the Internet economy. Looks like Barrett's got a strong foundation in place.

50 MORE PEOPLE WHO MAKE A DIFFERENCE IN ENTERPRISE NETWORKING

BIG THINKERS

HOWARD ANDERSON
Chairman, The Yankee Group

When arch-analyst Anderson talks, people listen, companies strategize and industries mobilize. His newest exploit, Yankee Tech Incubator, will buoy Internet infrastructure start-ups.

SCOTT BRADNER
Area director, Internet Engineering Task Force, and senior technical consultant, Harvard University

Just call him "the negotiator." In his *Network World* column, Bradner encouraged telecom standards bodies to cooperate and didn't let up. He helped pull off the International Telecommunication Union's presence at last summer's IETF meeting — a major stride that symbolizes the two organizations' desire to collaborate on telecom standards.

FRANK DZUBECK
President, Communications Network Architects

Insightful and authoritative, Dzubeck sees the big picture. That's why a spectrum of vendors and big user companies tune in to him for the scoop on the network industry.

KEN MCGEE
Vice president and research fellow, Gartner Group

Attention network executives: Are you negotiating a contract? Considering outsourcing? Wondering if staffing levels are appropriate? McGee's expertise can make your life easier.

TOM NOLLE
President, CIMI

A reputation for being a straight talker is tough to come by, but Nolle has earned it. Not much gets past this perennial skeptic; he sees through the hype and exposes the truth.

ILLUSTRATIONS PHIL DISLEY; STEVEN NOBLE (ETCHING)

JOHN CHAMBERS, PRESIDENT AND CEO, CISCO

Have any doubts about the potential of the Internet? Spend a few minutes with "The Reverend" John Chambers, and you'll be banking your business future on the 'Net in no time.

Chambers is the 'Net's most zealous evangelist — and for good reason. Cisco has grown from a $1.2 billion company back when the Internet transitioned from a research-oriented network to a commercial enterprise in 1995, to a company with a $16 billion run rate today. And Cisco conducts 80% of its business over the 'Net.

Coincidentally, 1995 is also when Chambers assumed command of Cisco.

But only cynics would say Chambers' exuberance for the 'Net stems entirely from Cisco's explosive growth. Listen to The Reverend during one of his many keynote speeches each year or even during a Cisco earnings conference call with analysts, and you'll realize that the Internet is bigger than Cisco or its competitors or the industry as a whole.

The 'Net is the anatomy of the world economy — its skeletal, muscular, nervous and circulatory systems. And no company benefits more from that than Cisco.

Under Chambers, Cisco has become the fastest-growing company in the history of the computing industry and one of the most admired companies in the world. It is also one of the most valuable, with a market capitalization closing in on $300 billion.

As a result, Chambers is considered one of the most innovative and dynamic leaders in global business today. In 1999, *BusinessWeek* named Chambers "Mr. Internet" and one of the top 25 executives worldwide. *Worth* named him the No. 2 CEO in America. ABC's "20/20" spotlighted Chambers as "The Best Boss in America," and *Time Digital* placed Chambers among the 10 most influential leaders shaping technology today. Even Bill Clinton and Al Gore described Chambers as "a true leader in this industry, in America's economy and in the global economy."

MICHAEL DELL, CHAIRMAN AND CEO, DELL COMPUTER

Dell — the company, not the man — is the world's fastest-growing major computer maker. It is so because Dell — the man — pioneered direct PC sales 15 years ago. The rest, they say, is history.

In that 15-year span, Dell has grown from a $6 million company to a $22 billion behemoth. What was once Michael Dell's hobby is now a PC and server company that gives industry leader Compaq a run for its money.

So what's Dell doing in networking? He's using the Web to revolutionize the way people shop, configure and purchase PCs and servers. Dell — the company — is now recognized as the largest online commercial seller of computer systems, with an average of $30 million per day in online sales.

And did we mention servers? Dell systems are cropping up all over the place, hosting the application processing needs of the Fortune 500 and the Forgotten 5,000,000, not to mention Internet and application service providers. In the server business, like PCs, Dell is nipping at the heels of rival Compaq.

Speaking of service providers . . . do we dare say Dell? In Europe, the company rolled out Dell.net, which offers customers Internet access and enhanced content along with a PC or server. Dell.net is headed toward the U.S. soon.

Currently Dell has a co-branded Web site with Excite.com for personalized news and content as well as PC support.

Support is another arena in which Dell — the man — is revolutionizing use of the Web. Dell — the company — is increasingly employing the Web for online support, and automating its internal processes and interactions with customers. The company already sees more than 40% of its revenue coming from sales over the Web, representing an $11 billion annual run rate.

So Dell — the man and the company — is harnessing the power of networking to become more of a network power in servers, service and service provisioning.

In networking, Dell is truly visionary, revolutionary and extraordinary.

NETWORK GUNS

ERIC BENHAMOU

Chairman and CEO, 3Com

The Palm Computing spinoff may be just what 3Com needs to refocus its efforts on the enterprise. If Benhamou can steer 3Com back to its network roots and deliver on his promise of smarter networks, he may earn a spot on our 25 Most Powerful list next year; he dropped out of it this year for the first time since we started the list.

MICHAEL CAPELLAS

President and CEO, Compaq

Chosen to succeed ousted CEO Eckhard Pfeiffer, Capellas inherited the task of restructuring the ailing Compaq. Six months into his tenure, the company's growth is still sluggish, but the CEO is trumpeting continued server development, new application service provider partnerships, simpler clients and wireless technology.

WU-FU CHEN

Chairman, Anda Networks, Cinta, Geyser Networks, Optimight Communications, Santera Systems and Zettacom

Chen is a serial start-up man. Two recent successes are Shasta Networks, sold to Nortel Networks, and Ardent Communications, sold to Cisco. With Chen's track record, you can expect more big-figure sales in his future.

DESH DESHPANDE

Chairman, Sycamore Networks

Talk about a clean start. Sycamore shipped its first product barely a year after forming, and Deshpande took the optical switch vendor public in October to first-day gains that reached more than seven times the $38 offering price. And, he's already secured a four-year, $400 million contract with Williams Communications.

ILLUSTRATION: DALE STEPHANOS

ILLUSTRATION: JOE CIARDIELLO

BERNARD EBBERS, PRESIDENT AND CEO, MCI WORLDCOM

One thing dawned on us when we were considering Bernie Ebbers for this year's 25 most powerful people in networking lineup.

We no longer need to slot Sprint chief Bill Esrey for inclusion in our Top 25. That's because once this latest megamerger clears regulatory hurdles, Esrey is on Ebbers' payroll. By landing Sprint, the No. 3 long-distance carrier, Ebbers significantly narrows the gap between MCI WorldCom and No. 1 AT&T.

What else, besides gobbling up big long-distance companies, is on Ebbers' mind? Wireless.

MCI WorldCom made some not-so-subtle overtures this year that it has plans to become a major player in this field by acquiring two wireless service providers, CAI Wireless and PrimeOne, and investing $300 million in Metricom, provider of the Ricochet wireless Internet access service. What's more, at press time the carrier was in the process of acquiring SkyTel, a nationwide wireless paging service provider.

On a more dubious power distinction, MCI WorldCom's frame relay network outage earlier this year demonstrated how the carrier could bring other companies — 3,000, to be precise — to their knees. The 10-day blackout forced customers to reassess their backup capabilities as well as their decisions to select MCI WorldCom as their carrier.

MCI WorldCom's handling of the frame debacle — replete with lack of information, finger pointing, blame shifting and general arrogance — is fodder for PR case study courses on how *not* to handle a crisis. MCI WorldCom did more to discourage customers from doing business with it than it did to inspire confidence or ensure that such a disaster won't happen again.

But Ebbers is a confident man, little phased by such troubles. His aggressive growth plans remain strong, and with his penchant for making big deals, we'll undoubtedly see him mastermind more acquisitions.

WILLIAM FRIEL, SENIOR VICE PRESIDENT AND CIO, PRUDENTIAL INSURANCE COMPANY OF AMERICA

Business 101 courses teach us about listening to customers, that the customer is always right. Though we can't possibly do everything all customers ask of us, a select few do guide our practices. Bill Friel is a member of that elite group.

You've probably seen the full-page ads in *The Wall Street Journal* showing a smiling Friel endorsing IBM's Lotus Notes software. IBM and Lotus are just two of the network-related companies on whose advisory boards Friel sits. The others include Microsoft and Intel. Not bad when such leading computing companies have you as an advisor.

That's the kind of influence Friel quietly wields in our industry. So then, what's he done for Prudential?

Consider the facts: Since becoming Prudential's chief information officer in 1995, Friel has built a company driven toward world-class IT operations. He created the Year 2000 Project Management Office to begin aggressive, controlled elimination of the Year 2000 threat. He spearheaded the company's efforts to upgrade an outdated infrastructure, eliminating legacy circuits and equipment, and creating a single, streamlined routed frame relay network to connect Prudential offices in 900 sites globally.

Friel created the Corporate Information Technology group to set, implement and manage company standards for hardware, software and IT processes. He led a companywide technology procurement program, saving millions of dollars and earning recognition by Gartner Group as best in its class for IT procurement and asset management.

Friel also created an emerging technologies group to preview the latest technologies and partner with vendors to create products that meet Prudential's IT needs.

Under his leadership, the company upgraded its Internet sites, intranet and customer service call centers, and continues to build on its promise to provide service to customers anytime, any place and in any way they prefer.

50 MORE PEOPLE WHO MAKE A DIFFERENCE IN ENTERPRISE NETWORKING

NETWORK GUNS

JUDITH ESTRIN

Chief technology officer and senior vice president, Cisco

Estrin's technology and business prowess helps keep Cisco at a winning pace and, arguably, sets the course of the network industry in turn. A true entrepreneur with the technical know-how to identify healthy prospects, Estrin joined Cisco when it acquired her third start-up, Precept Software.

BOBBY JOHNSON

President and CEO, Foundry Networks

Founder Johnson made this Ethernet switch maker profitable before its hugely successful September IPO. Watch out Cisco: Foundry's low prices and high performance are earning customers and kudos.

SCOTT KRIENS

Chairman, president and CEO, Juniper Networks

High-speed Internet routers are Kriens' answer to carriers that need stronger, more robust backbones. Though not yet profitable, Juniper is still formidable with a year of rising revenue and a successful June IPO.

MICHAEL RUETTGERS

President and CEO, EMC

Ruettgers' latest big move was the Data General acquisition, which secures a place for historically high-end EMC in the midrange storage market and brings server-clustering technology that EMC hopes to translate into products.

GORDON STITT

Chairman, president and CEO, Extreme Networks

With Stitt leading the way, Extreme has played strong and stayed independent, turning heads with its signature purple boxes and newsmaking April IPO — which made it one of the first of 1999's network IPO success stories.

BILL GATES, CHAIRMAN AND CEO, MICROSOFT

After years of scrutiny, the federal government has finally rendered a decision: Microsoft abused its power in the industry to thwart competition, influence business partners and consumers, and stall technological innovation. Microsoft is a monopoly.

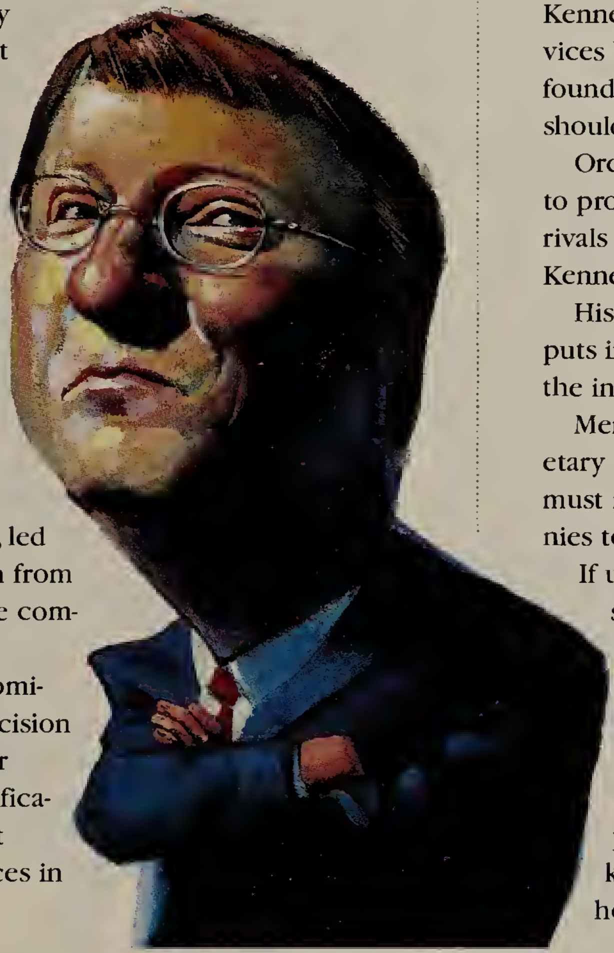
That's about as powerful as it gets. Monopoly.

Aside from this dubious affirmation of Microsoft's power and the anxiety about what comes next (will Judge Thomas Penfield Jackson order that the company be broken up?), 1999 was a stellar year for the Rage of Redmond. Fiscal 1999 revenue of $19.8 billion was up 29% from fiscal '98 revenue, and earnings of $7.8 billion were up a whopping 73% from a year ago.

Microsoft made significant strides in its Internet and network product portfolios with new offerings and initiatives for Web-hosted e-commerce applications and application service provisioning, and by increasing support for the XML programming language. But the company riled many in the Internet community when it would not commit to integrating IP Version 6 into the soon-to-be-released Windows 2000.

Microsoft also served notice that it intends to be a major force in broadband access by investing $5 billion in AT&T with the expectation that AT&T will put Windows CE in the cable set-top boxes of recent acquisitions Tele-Communications, Inc. and MediaOne.

But Microsoft also faces a number of challenges, ones that may chip away at the monopoly power the company enjoys. One is the open source operating system movement, led by the Linux disciples. Another is competition from 3Com's Palm division — soon to be a separate company — for the operating system software in handheld devices. But the most obvious and ominous is the impending Justice Department decision on whether Microsoft should be broken up or remain intact. That will have far-reaching ramifications not only for the company and Gates, but also for the industry, the economy and advances in high-tech.



TRAVER GRUEN-KENNEDY, CHAIRMAN, ASP CONSORTIUM

If the pundits are correct, application outsourcing will be a multibillion-dollar industry in a short period of time. If that happens, we can give thanks to Traver Gruen-Kennedy.

Since opening up shop in June, the ASP Consortium boasts 60 member companies, including AT&T, Cisco, Citrix (Gruen-Kennedy is director of advanced business development there), Lucent, Sprint, Sun and UUNET. The group's goals are to educate the industry, sponsor research and foster standards.

For instance, the consortium will develop "guidelines for standards," Gruen-Kennedy says. The standards will help in the certification of application services by third-party companies such as Ernst & Young, one of the consortium's founding members. The standards also will outline how application services should be secured, delivered and managed.

Orchestrating this type of activity among 60-odd companies — each looking to protect its own interests and further its own agenda while cooperating with rivals for the good of the industry — is no small feat. That's where Gruen-Kennedy comes in.

His charge will be to put into practice what the ASP Consortium Web site puts in words: to foster a group effort that will benefit the members by helping the industry grow more rapidly and gain additional prestige with customers.

Members will require a guarantee that they will not have to disclose proprietary information as part of their consortium activity. Indeed, Gruen-Kennedy must market participation in the ASP Consortium as an opportunity for companies to learn about the market and, in turn, educate the world.

If users are ever confident enough to off-load their application hosting to a service provider, it will be because Gruen-Kennedy was instrumental at getting these 60 companies to sing from the same songbook.

On the other hand, if the ASP Consortium goes down in flames due to vendor squabbling or protective paranoia, it has the potential to bring the whole ASP industry — and Gruen-Kennedy — down with it.

It's Gruen-Kennedy's job to keep that squabbling to a minimum while providing evidence of ASP Consortium progress, and educating the market on the benefits of application service providers. Gruen-Kennedy could hold the power that makes or breaks the ASP industry.

NETWORK GUNS

LARRY WALKER

President, C-Port Corp.

Could this be the end of custom ASIC chips? Walker has the industry thinking twice about network software development with C-Port's new C-5 digital communications processor. The company's programmable chips will let equipment vendors upgrade software modules, enabling them to bring new features to market considerably faster than they can with ASIC chips.

JIM ALLCHIN

Senior vice president, Microsoft

Recovering from this year's low point — trying to explain a botched video demo in the early stages of the antitrust trial — Allchin is leading Microsoft's enterprise push. He's responsible for getting Windows 2000 out the door and battling operating system competitors Linux, Novell and Solaris.

STEVE BALLMER

President, Microsoft

Microsoft's No. 2 executive spins answers to antitrust allegations, takes the heat for interminable Windows 2000 delays and does his best to convince the world that the oft-postponed ship date means that Microsoft won't be sending out a faulty product that relies on fixes and upgrades. In between, he speculates publicly that many tech stocks are overvalued and finds many people listen to him — much to Wall Street's chagrin.

GARY BLOOM

Executive vice president, Oracle

The complement to Oracle's flamboyant CEO, soft-spoken Bloom oversees database and application server product development. He's also responsible for mergers and acquisitions. He helped bring to fruition the partnership with Hewlett-Packard whereby sales teams collaborate and share leads.

ILLUSTRATION: FRED HARPER

THOMAS PENFIELD JACKSON, U.S. DISTRICT JUDGE, DEPARTMENT OF JUSTICE

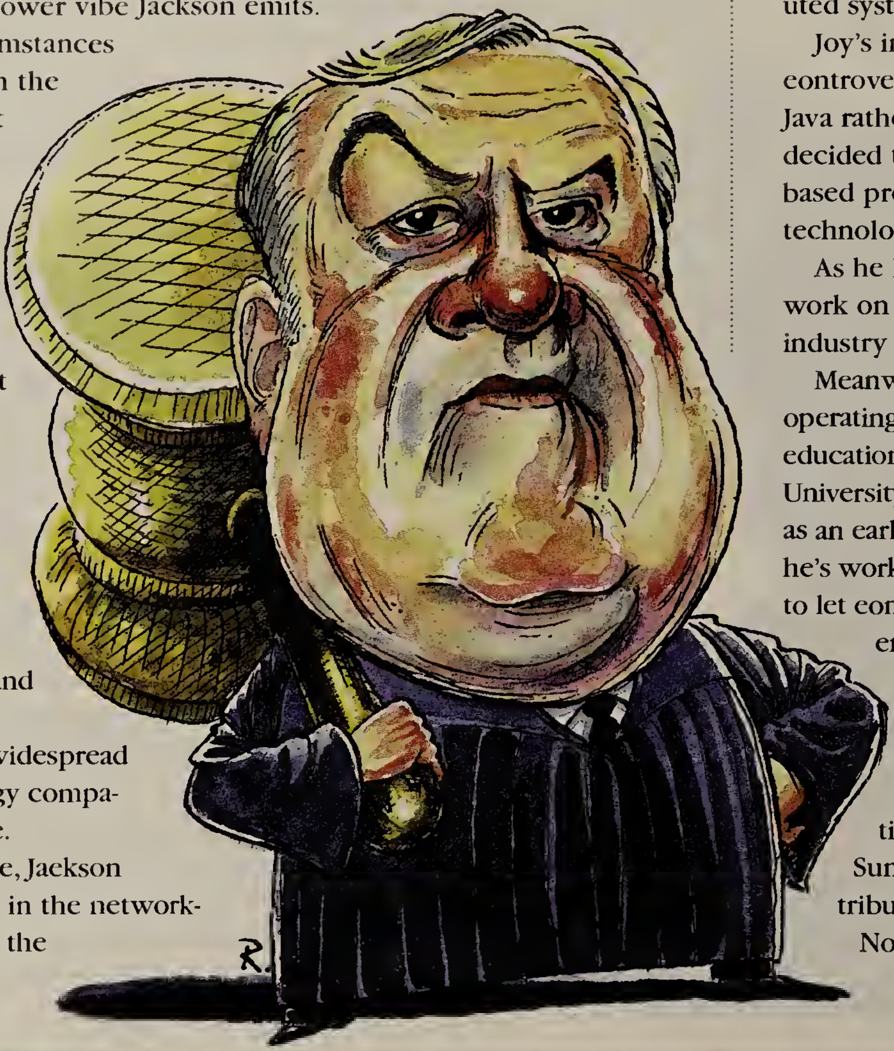
Perhaps nothing would rock the network industry more than Microsoft's breakup. That power lies firmly in the hands of Judge Thomas Penfield Jackson, whose recent landmark ruling that Microsoft is a monopoly makes this a distinct possibility.

Even if Jackson leads government officials into a settlement other than a full-fledged breakup, one thing is certain: Microsoft will never be the same. At best, the company will lose its grip on one of its pulsating sources of power: Windows. Even if Microsoft rebounds fully from that blow, government scrutiny will alter its brutal business practices.

Moreover, the notoriously ruthless Bill Gates may never be the same. Anyone who watched the tapes of Gates squirming during prosecutors' questions can feel the power vibe Jackson emits. Under what other circumstances could the richest man in the world, running the most powerful software company in the world, be in someone else's control?

Jackson's 207-page findings of fact set the stage for a verdict against Microsoft. With that much ink on paper declaring monopoly, Jackson is unlikely to release Microsoft without a scratch. More likely is a string of appeals that ultimately land in front of the Supreme Court; that would have widespread influence over technology companies for decades to come.

Whatever the outcome, Jackson wields enormous power in the networking industry as we enter the next millennium.



BILL JOY, FOUNDER AND VICE PRESIDENT OF RESEARCH, SUN

Bill Joy is one of the industry's leading visionaries, innovators and influencers.

Sun is a pioneer in distributed, platform-independent client/server computing, and Joy has led Sun's technical initiatives for a number of years. He is the driver behind the ubiquitous Network File System, the business and technical strategy for the Java programming language, and, most recently, the Jini technology for networking distributed systems using Java.

Joy's importance is sure to grow even more now that Sun has made the controversial decision to maintain a tight grip on the technical course for Java rather than hand off that work to an international standards body. Sun decided to keep Java in-house to control compatibility among various Java-based products, speed Java development and maintain its copyright on the technology.

As he has done up to now, Joy will play a major role in Sun's further work on Java and in its decision to keep it in-house or open it up to the industry at large.

Meanwhile, Joy is instrumental in the open source movement, in which operating system software source code is freely available to the industry for education, alteration, enhancement and improvement. Joy's work at the University of California at Berkeley on the Berkeley version of Unix is viewed as an early example of open source operating system software. And currently he's working on Sun's Community Source Licensing Model, which is designed to let companies share intellectual property in source form to facilitate cooperation with customers, partners, educators and researchers.

And while he juggles that, Joy will continue his power agenda on researching new methods of human/computer interaction, new microprocessor and system architectures, and the application of complex adaptive systems, quantum computing and cognitive sciences in computing. Indeed, Joy's power only increases as Sun competes with Microsoft to set the technical direction for distributed computing in the age of the Internet.

No doubt, it'll be a joy to see what this guy comes up with next.

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50 MORE PEOPLE WHO MAKE A DIFFERENCE IN ENTERPRISE NETWORKING

NETWORK GUNS

KIM CAMERON

Metadirectory architect, Microsoft

This former Zoomit architect knows metadirectories, which is just what Microsoft was after when it acquired Zoomit and brought him on board. Microsoft will use Via, Zoomit's flagship product, to make Active Directory more flexible and easier to meld into existing directory infrastructures. Cameron's expertise is critical for the undertaking.

LARRY ELLISON

Chairman and CEO, Oracle

Ellison's reinvigorated, and he wants to do the same for his database company. He's embracing the idea of e-corporations and Webifying everything in his path, including Oracle's new sales and marketing strategies. Ellison's efforts include a dip into the application service provider business with the launch of Oracle Business Online.

LOU GERSTNER

Chairman and CEO, IBM

Big Blue's charismatic big man showed that you can teach an old dog new tricks. He narrowed IBM's focus by selling its Networking Hardware Division and its carrier-managed services unit, and helped link IBM's name with e-business through a far-reaching publicity campaign.

DEBORAH RIEMAN

Executive director, Check Point Software

Rieman's sales and business savvy helped Check Point reach the 100,000-customer mark in security installations in late 1999. Now in her new position, this stalwart of the security market turns her attention to long-term growth strategies for the company.

ILLUSTRATION: GEORGE RIEMANN

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Continued from page 42

WILLIAM KENNARD, CHAIRMAN, FEDERAL COMMUNICATIONS COMMISSION

Bill Kennard has had a heavy agenda in the past year.

Last fall, Kennard and the Federal Communications Commission passed strict new rules, backed by a promise to levy heavy fines, to protect consumers against slammers — phone companies that illegally switch phone service without the knowledge or permission of enterprises or consumers.

He also railed against the merger of MCI WorldCom and Sprint, calling it a surrender in the long-distance price war, challenging the companies to demonstrate the benefits for consumers.

On the sticky issue of granting service providers access to cable networks, Kennard turned down a request from local government officials for an inquiry into whether cable companies unfairly restrict their customers' choices for ISPs. At that time, he said government intervention would chill overall development of broadband networks; his decision is likely to set off a full-scale battle among service providers for last-mile broadband access services.

Last spring, Kennard pushed for increased annual funding — up to $2.3 billion — to help get schools and libraries wired to the 'Net. And Kennard also said he would like to get the FCC to focus on enforcing marketplace competition rather than writing telecom regulations.

While absent from last year's Top 25 Power lineup, Kennard makes this year's list because the initiatives undertaken in the past year demonstrate his commitment to making sure all telecom consumers have access to the technologies driving the U.S. economy and shaping society. A consumer advocate, Kennard is committed to ensuring that consumers have the information they need in order to compete in a hotly competitive business marketplace.

In 2000, expect more of the same from Kennard. Expect that as the industry consolidates and more technological advances promise to either empower or impede progress in the industry and of the consumer, Kennard will take a strong, but measured and well-thought-out, stance. His decisions will be made with the best intentions of the consumer in mind.

Kennard is looking to empower people with network technology. To that we say, more power to him.

VINOD KHOSLA, GENERAL PARTNER, KLEINER, PERKINS, CAUFIELD & BYERS

Vinod Khosla, the "other" Kleiner, Perkins, Caufield & Byers (KPCB) partner, is a hot commodity in 1999. In fact, he tops many peoples' "A" list of venture capitalists for the year — at times supplanting fellow KPCBer John Doerr.

His megadeals in '99 were capped with Redback Networks' acquisition of Siara Systems for $4.3 billion in stock. Khosla, who was one of Siara's earliest backers and a board member, will now sit on Redback's board.

Khosla's prints also are on another '99 biggie: Cisco's slated buyout of Cerent for $6.9 billion. KPCB's 30% stake in Cerent, picked up for a mere $8 million, now is valued at a cool $2.3 billion. And Khosla's backing of Juniper Networks, which went public in June, gives KPCB another multibillion-dollar investment.

Yet the founder and former CEO of Sun, where he pioneered open systems and commercial RISC processors, says he doesn't like to think of himself as a power broker or even a venture capitalist. Instead, he considers himself a "company builder."

This is such a great market that even a fool can be successful, he says. "I can tell you how smart I am, but the fact is I really know that luck has played a huge role in this," the ever-modest Khosla explains.

Besides Cerent, Juniper, Siara and Redback, what are some other companies benefiting from Khosla's "luck?" He serves on the boards of network-related companies Asera, Concentric Network, Corio, Corvis and Qwest Communications, plus several private companies.

— *BY SUSAN MARKS*

Continued on page 46

ILLUSTRATION: SAM SISCO

50 MORE PEOPLE WHO MAKE A DIFFERENCE IN ENTERPRISE NETWORKING

NETWORK GUNS

SCOTT MCNEALY
Chairman and CEO, Sun

Famous for his Microsoft-bashing Top 10 lists, Sun's competitive CEO is an antitrust agitator, network computing advocate and unrelenting Java spokesman. Ever seeking an edge, he teamed with America Online to yield the Sun-Netscape Alliance and a chance to take advantage of Netscape's e-commerce software.

STEVE SAVIGNANO
Senior vice president, Sun-Netscape Alliance

Netscape veteran Savignano is responsible for e-commerce applications at the alliance. Among the enterprise software gems Netscape brings to the table are its Web infrastructure products and a suite of e-commerce applications for business-to-consumer and business-to-business transactions.

LINUS TORVALDS
Creator, Linux operating system

Torvalds lives by a simple maxim: "Do unto others as you would have others do unto you." His powerful yet simple (a half-million lines of code to Windows' seven million) operating system has taken the industry by storm. Linux is opening up the non-Windows possibility like nothing before has been able to do — and you've got to pay maximum respect to a guy capable of generating such a phenomenon, and so modestly.

MICHAEL ZISMAN
Executive vice president, Lotus Development; vice president, IBM

Zisman looks for areas in which Lotus and parent company IBM can work together. His latest fertile finds are in knowledge management and collaborative communications. Watch for the companies to reach beyond traditional messaging and groupware and delve into instant messaging and real-time collaboration, data mining, distributed learning and videoconferencing.

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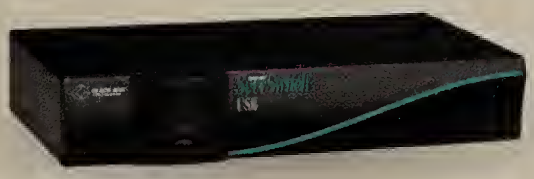

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DREW MAJOR, CHIEF SCIENTIST AND VICE PRESIDENT, ADVANCED DEVELOPMENT, NOVELL

Novell is reinventing itself from a developer of network operating systems (NOS) to a supplier of enterprise directory services. Drew Major is the catalyst behind that metamorphosis.

A NOS designer since 1981, Major helped develop the original NetWare, and has played an integral role in designing and developing every release of the now-ubiquitous NOS. He continues to be involved in the research and development of future NetWare products.

Presently, he is leading Novell's advanced product development team, helping to set product and strategic directions for NetWare and Novell Directory Services, as well as for Novell itself. He was instrumental in bringing the Java programming language into NetWare, adding CORBA and distributed object-oriented technologies into Novell products, and rolling out Novell's BorderManager intranet/Internet products.

He is even the driver behind more controversial product directions, such as Novell's decision to replace the redirect in NDS for Windows NT with an XML-based substitute. The redirect let users reroute authentication and access-control calls made to NT 4.0 domains into NDS, which would virtually eliminate user management on NT servers.

But Novell's — and Major's — decision to scrap this redirect in an upcoming version of NDS for NT could force users to choose between NDS and Microsoft's Active Directory for their enterprise directory services instead of easily mixing and integrating both environments.

As for Novell's flagship NetWare offering, Major is positioning the future of the NOS as a platform for supporting specialized server appliances, such as caching, directory and storage-area network servers.

So why does Major make our Power lineup this year? The future of Novell's technology sits squarely in his hands. The future of Novell as a company rests in large part with Major as well — as does the company's ability to fend off Microsoft in the directory and Internet server software battles.

Whatever directions NetWare and NDS head, they will do so under Major's instructions. His decisions have the power to impact millions of Novell users.

RICHARD MCGINN, CHAIRMAN AND CEO, LUCENT

"I spy an enterprise market" could well have been Rick McGinn's mantra for 1999. Under his leadership, Lucent kept the pressure on Cisco with a newly defined enterprise division, acquisitions, its continued presence in the server provider market and generally deep pockets. In fact, Lucent is more than four times the size of Cisco, with 140,000 employees and an annual revenue of $3.8 billion.

Facing heavy criticism for being all talk and no action in the enterprise market, McGinn finally restructured the company in October to carve out an enterprise unit, Lucent Enterprise Networks. The company is placing its popular PBX systems — the one product group that has a stronghold in the enterprise — under this umbrella. Seemingly, this will assist the company in fulfilling McGinn's pursuit of convergence, which he's been touting to corporate customers for years.

His new enterprise services unit should help. Among acquisitions, in November it added enterprise systems integrator International Network Services to its family. Now maybe we'll see this network equipment giant take on its smaller, yet more dominant, competitor as Cisco reaches up into the fat and juicy service provider market and McGinn competes strategically for the enterprise.

McGinn's no stranger to the inner workings of a large enterprise, either. In addition to steering Lucent, he is on the boards of American Express and Oracle. He is also a member of the Executive Committee of the Council on Competitiveness, a bipartisan Washington advisory group. All in all, his power radiates far and wide.

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ILLUSTRATION SCOTT LAUMANN

50 MORE PEOPLE WHO MAKE A DIFFERENCE IN ENTERPRISE NETWORKING

INTERNET PLAYERS

STEVE CASE

Chairman and CEO, America Online

Case continues to defy predictions of AOL's imminent demise and grow AOL in new directions, including the Netscape acquisition and Sun partnership. Particularly attractive to Case and crew was Netscape's Web shopping portal for business and developer users, which will help AOL diversify its historically consumer audience.

GEORGE CONRADES

Chairman and CEO, Akamai Technologies

Akamai made a splash in the Web-hosting pool last spring when it promised to speed content delivery and guaranteed 100% uptime for pages it hosts or your money back. Conrades, who was tapped to lead the start-up Web hoster last April, saw shares rise 450% over the offering price in the company's late October IPO.

ESTHER DYSON

Interim chairman, Internet Corporation for Assigned Names and Numbers

Dyson is a pivotal player in the domain-naming debate from her seat at the ICANN helm. She also captures people's attention as chairman of Edventure Holdings, publisher of the "Release 1.0" newsletter, and now a board member of the Internet Policy Institute think tank.

KATHLEEN EARLEY

President, AT&T Internet Services

Earley continues to advance AT&T's Internet service offerings, launching high-speed services for business customers in the fourth quarter of 1999 that include digital subscriber line service in 17 cities and market trials of cable access in six cities. The carrier also sped plans to upgrade its OC-48 IP backbone to OC-192 capacity.

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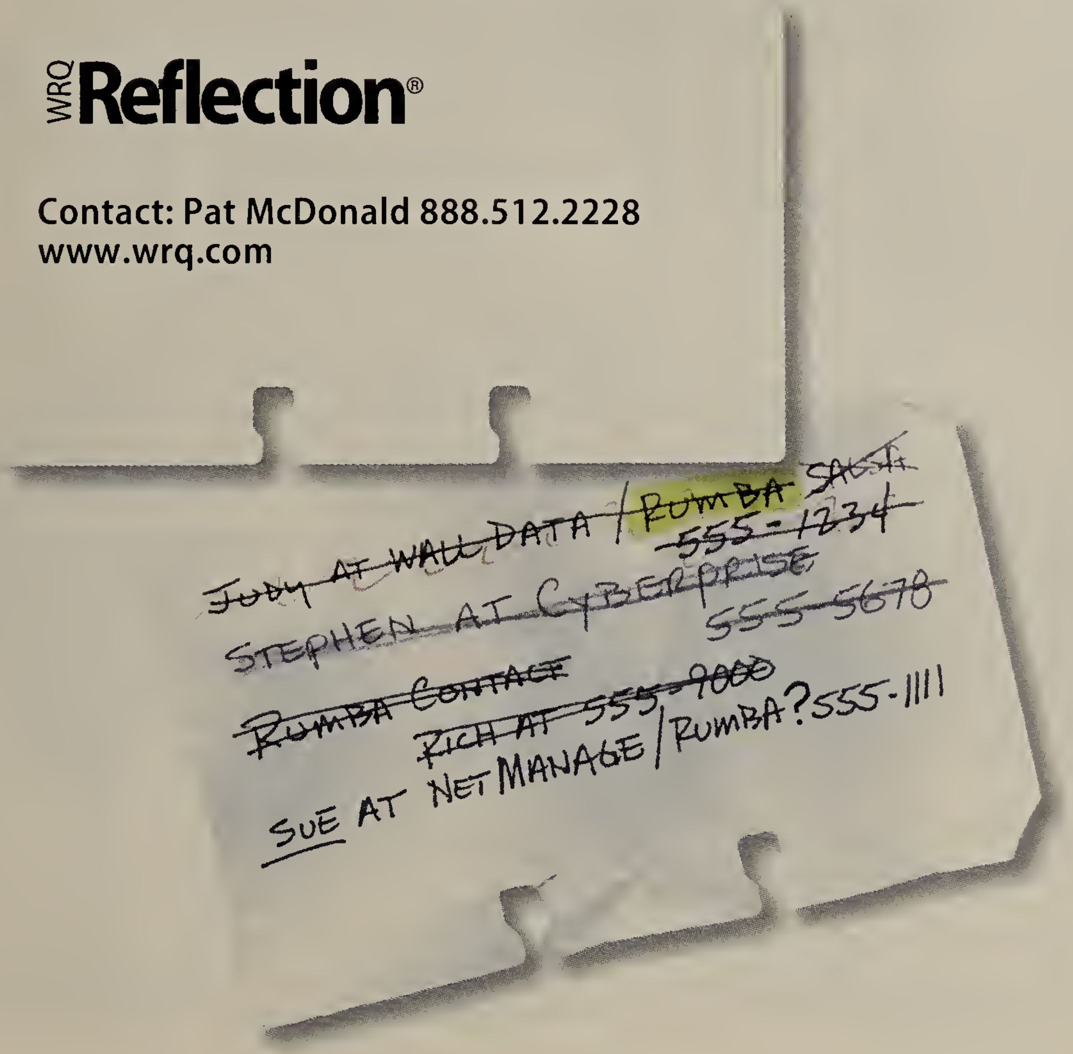
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JOHN MCKINLEY, SENIOR VICE PRESIDENT AND CHIEF TECHNOLOGY OFFICER, MERRILL LYNCH

A year ago, we criticized Merrill Lynch for being slow in getting to the Internet trading table. But that's changed — and how. Merrill Lynch has not only moved into online trading, but also has been rated in the No. 2 spot of online brokerages, according to Forrester Research. Amazing for a full-service brokerage that has historically wrinkled its nose at technology.

Merrill's move into online trading validates this fledgling market — while also fighting back. Full-service brokerages are under siege by their cheaper discount competitors. Online trading puts the power in the hands of the customer. It also shreds commissions from a cushy $200 to a mere $20 per trade. In the next two years, those that don't master the online venue will be irreparably damaged.

But McKinley's threat isn't just competition. It's building a network with reliable sub-second response times simultaneously to hundreds, and eventually thousands, of points. Such networks are beyond the bleeding edge. If a discount brokerage has reliability problems — oh well — you get what you pay for, and you know you're in the brave new Internet world. Not so for the sacred brand name Merrill Lynch, which puts its reputation on the line with every trade.

Nevertheless, McKinley's architecture is being rolled out in front of its traditional customers — the institutional investors — like a red carpet. Giving these investors the same facilities to manage their portfolios online is a gutsy move for Merrill. After all, that's what its thousands of employees get paid to do.

Moreover, McKinley is guiding the company to aggressively woo the new breed of independent self-reliant trader. Earlier this month, the company launched its discount online trading Web site, Merrill Lynch Direct. This site offers the traditional wee-fee trading and other perks, such as bill paying, a cash management account and others.

To build and service this network, McKinley sits on a multibillion-dollar budget, with a view. He is reportedly the only Merrill techie with an office on the executive floor.

McKinley is used to being on the hot seat. Prior to undertaking Merrill's technology strategy he was the chief technology officer for GE Capital, a company known for its strategic use of technology and the Internet. And from 1992 to 1995, he was a partner with Ernst & Young.

JOSEPH NACCHIO, CHAIRMAN AND CEO, QWEST COMMUNICATIONS

If you can't describe Joseph Nacchio as gutsy, who would fit that bill? Nacchio doesn't just want to take a piece of the telecom pie, he wants to own it. And he's gaining ground on that desire, turning the world on its ear when in July, Qwest made a successful bid for regional Bell operating company U.S. West.

That puts Nacchio at the head of a $65 billion company. That's right up there with his former alma mater, AT&T ($53 billion in 1998) and light years ahead of the $2.3 billion company Qwest was before adding U.S. West into the mix. Nacchio is arguably in the No. 3 long-distance vendor position and is banging on the door of the top two, AT&T and the impending MCI WorldCom-Sprint behemoth.

Power breeds more of the same. Nacchio is itching for ever greater expansion, this time into international markets. Qwest and KPN, the Dutch telecom company, have formed a venture to build and operate a fiber-optic IP-based network that currently spans 2,100 miles and will cover 8,100 miles when completed in 2001. Qwest also has nearly completed a 1,400-mile network in Mexico.

In the U.S., the company lords over an 18,500-mile nationwide fiber-optic IP network and is now working on the construction of 25 local fiber networks, in the nation's top metropolitan areas.

Now all Nacchio has to do to maintain his power base is make sure Qwest meets demand. That'll be quite a challenge: He came to Qwest with a résumé chock full of consumer long-distance experience, but the enterprise is a different beast and complaints have already surfaced that Qwest is slow to service.

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50 MORE PEOPLE WHO MAKE A DIFFERENCE IN ENTERPRISE NETWORKING

INTERNET PLAYERS

PAUL GAUTHIER
Chief technology officer, Inktomi

Inktomi co-founder Gauthier first helped users find items on the Web by powering servers and search engines all over the 'Net. Now he's going to help us bargain-shop with comparative-shopping search engine services.

ELLEN HANCOCK
President and CEO, Exodus Communications

Under Hancock's determined hand, Web hosting provider Exodus has data centers springing up around the world through acquisitions and strategic partnerships. The idea? Bring global customers closer to Web sites through dozens of data centers, and they'll get the information faster.

TIM KOOGLE
President and CEO, Yahoo

Who doesn't Yahoo? Not many. Koogle made Yahoo the go-to directory of Web sites, and now he has e-commerce on his mind. Among Yahoo's enhancements are shopping, auctions, e-mail and chat services, and online audio and video programming sources. So far, so good. Yahoo is profitable, with third-quarter 1999 revenue exceeding third-quarter 1998 revenue by 134%.

SERVICE PROVIDERS

CATHERINE HAPKA
Chairman and CEO, Rhythms NetConnections

On the heels of its April IPO, Hapka's competitive local exchange carrier is aggressively pursuing plans to roll out business-class digital subscriber line (DSL) services in 50 U.S. cities by the end of 2000. Hapka's also taken this DSL provider public, with an April IPO.

ILLUSTRATION: DARREN THOMPSON

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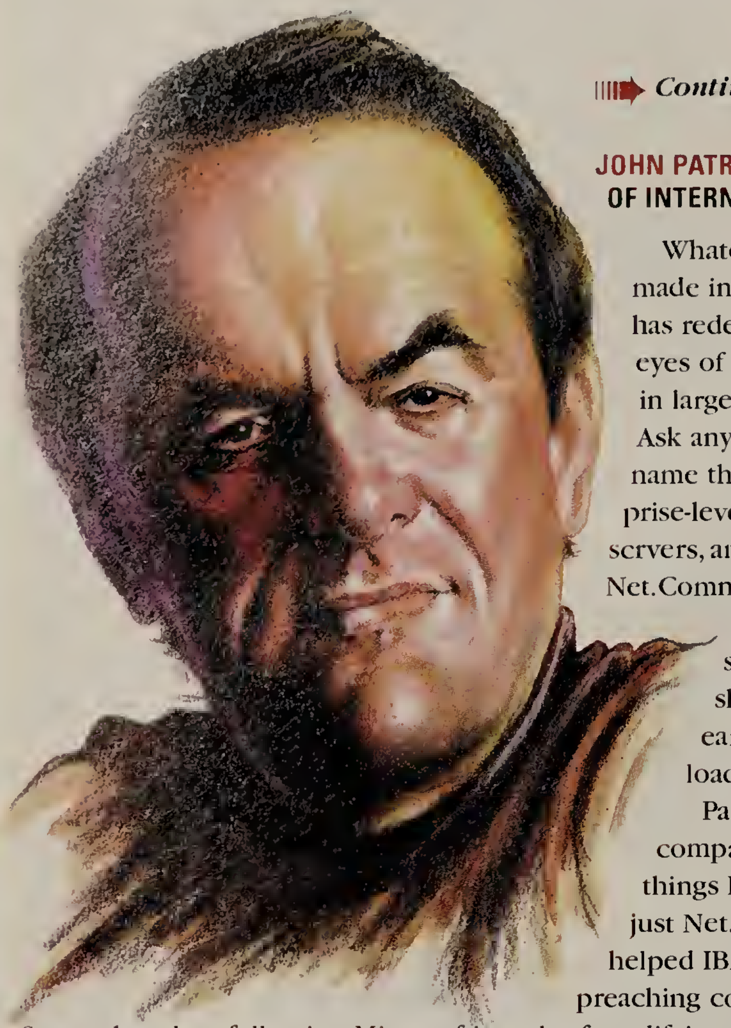

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JOHN PATRICK, VICE PRESIDENT OF INTERNET TECHNOLOGY, IBM

Whatever mistakes IBM has made in its 88-year history, it has redeemed itself in the eyes of the Internet, thanks in large part to John Patrick. Ask any network manager to name the top three enterprise-level e-commerce servers, and you'll hear IBM's Net.Commerce, followed by an "Ummm?" and a shrug. For that mind share, Patrick has earned himself an armload of power.

Patrick, though, is the company's visionary in all things Internet at IBM, not just Net.Commerce. He helped IBM embrace Java by preaching cooperation with rival Sun, rather than following Microsoft's path of modifying Java. He is also the internal Internet guru, constructing IBM's Get Connected Program. Get Connected prescribes how IBM employees should use the Internet and functions as a model for the Internet services it sells.

A founding member of the World Wide Web Consortium, Patrick is known internationally for his ideas on what the Internet can become. Washington has recognized this. He is involved with Next Generation Internet Task Force, a government-led initiative to build the next, high-speed internetwork. He is also the chairman of the Global Internet Project, a private-sector gaggle of international executives interested in the Internet's ongoing development.

Patrick promises to continue bolstering IBM's presence (and power) as an Internet player. He's vowed that IBM will forge partnerships so it can sell a wider variety of e-business software products and strengthen its position in the standards-based Internet world. We'll see if Patrick has the power to make good on that promise, given the weird open vs. closed dichotomy that characterizes IBM's culture.

JOHN ROTH, PRESIDENT, CEO AND VICE CHAIRMAN, NORTEL NETWORKS

When it comes to the enterprise market, Nortel Networks is biting at Cisco's heels like a red ant. Under John Roth's visionary leadership, Nortel has assumed the No. 2 router maker position. Today, Nortel skims one-third of its revenue from data products, and Roth wants to grow that figure 50% within three years.

To do that, Nortel is aggressively beefing up its IP product offerings and spewing out numerous new products in that hallowed area called convergence. Indeed, Roth has committed 60% of Nortel's $2.5 billion research and development budget to IP technology. On average, the company files three patent applications per day.

Roth is further raising the stakes on the lucrative $17 billion worldwide router market. In November, Nortel announced a bitingly competitive move to slash prices on its access routers so they cost half the list price of Cisco's. If low price won't get them, then the old PC-compatible marketing ploy just might. At the same time, Nortel issued licenses to more than 75 OEMs for its Open IP Environment routing and IP software. The software lets companies Internet-enable everything from servers and network processors to Internet appliances. The goal, of course, is to create a commodity enterprise router market. It's Macs vs. IBMs all over again.

Still, Nortel is far from a one-product company. It remains the No. 2 phone equipment maker in North America and is pounding on the doors of the wireless Internet, optical networking and computer security markets.

But Roth's most significant goal is to remake Nortel's image as a communications equipment supplier into that marketing marvel known as an Internet company.

To that end, Nortel is banging on the door of the application service provider (ASP) market. Earlier this month, it announced an agreement with Hewlett-Packard and several other ASP-wannabe vendors to provide a one-stop shop for ASP products. One call to Nortel, and it'll deliver an entire multivendor ASP architecture to an ISP's door.

For the enterprise, Roth will bundle its enterprise router, wireless Internet devices and call center products, and declare itself your e-business source.

Roth clearly wants to be the "I" of the enterprise's Internet-related purchasing.

SERVICE PROVIDERS

CHARLES LEE
Chairman and CEO, GTE

Lee helped orchestrate GTE's sale to Bell Atlantic, a transaction that will create the largest U.S. phone company when it's completed. Lee will be co-CEO with Bell Atlantic's Ivan Seidenberg, king of the telecom megamerger.

CRAIG MCCAW
Chairman and CEO, Eagle River

Wireless pioneer and telecom investor McCaw counts among his interests Nextel, which he took control of in 1995; NextLink Communications, which he founded; Teledesic Corp., which he formed with Bill Gates; and near-bankrupt ICO, whose satellite phone system he plans to rescue. More than a deal-maker, McCaw understands wireless and knows how to exploit the market.

RICK ROSCITT
President and CEO, AT&T Solutions

Roscitt took a fledgling AT&T services division and is turning it into a competitive high-tech outsourcing business faster than anyone thought he could. Thanks in part goes to the assets AT&T acquired when it purchased IBM's Global Network business, and Roscitt got a big boost in September when AlliedSignal awarded AT&T Solutions a $400 million-plus contract to manage most of its network architecture, including routers, LAN hubs and switches.

IVAN SEIDENBERG
Chairman and CEO, Bell Atlantic

An estimated 20 million wireless customers will be served by Seidenberg's telecom empire, once Bell Atlantic's acquisition of GTE is finalized and if its joint venture with Vodafone AirTouch gets underway. Now that's power.

ILLUSTRATION: BRIAN LEAVITT

PATRICIA RUSSO, CEO, SERVICE PROVIDER NETWORKS GROUP, LUCENT

Patricia Russo is who network entrepreneurs conjure up when they're hoping to land a multimillion-dollar acquisition. Since 1996, Russo has been the kingpin in Lucent's shopping spree. As executive vice president of strategy, business development and corporate operations, she reportedly controlled 27 of Lucent's 29 acquisitions, valued at a cool $32 billion.

Despite Lucent's origins from Bell system creativity, the equipment maker owes its position in the datacom world to technology it bought. For that, Russo garnered herself the top executive slot for Lucent's Service Provider Networks group, formed in October when Lucent reorganized itself along market lines.

The service provider market remains Lucent's bread and butter. This division, which Russo now controls, consists of optical networking, switching and access systems, wireless networks, and communication software businesses. But it also has a chunk of Lucent's convergence schemes. In Russo's capable hands, her group will prod cable TV operators into the world of datacom — an area in which they are sorely in need of assistance.

If Russo's past is a prediction of her future, her savvy business sense spells success. Prior to her role as one of the industry's ultimate power shoppers, she ran Lucent's Business Communications Systems Unit. She molded that $6 billion unit into Lucent's second-largest global business. She's placed among the company's top five executive leaders, and some have dubbed her Lucent's "chief of staff."

ERIC SCHMIDT, CHAIRMAN AND CEO, NOVELL

Eric Schmidt has completed the public relations coup of the industry.

He's turned Novell from a directionless near has-been into a respected vendor with downright fanatic customer loyalty.

A rare combination of technical brilliance and business know-how (with a good sense of humor to boot), Schmidt has turned Novell into the white knight to Microsoft's black-clad challenger.

Seizing the enterprise's dire need for directories, Schmidt has catapulted that one product into a business strategy that refreshed the entire company.

Novell has returned to consistent profitability, with as much as 90% of the company's quarterly revenue coming from directory-based products.

Schmidt intends to maintain the company's grip on the directory market, even after Microsoft's hugely hyped Active Directory finally makes its debut. As proof, he will push Novell's directory strategy into the brave new world of XML.

Novell's dirXML product will raise the bar for open standards and interoperability between the directory and other applications. That's a crucial next step for the directory, if it is to become the heartbeat of network systems management and access control it could be.

The "one product, many faces" approach is working well for Novell — and is a striking difference between this company and the multidivisional network behemoths that otherwise grace our Power lists.

Of course, Novell does have other products, namely its network operating system and e-mail server. It has also begun to venture into new Internet waters as well, with Web caching. Now if only Schmidt could achieve the same sort of success he's attained in directories in Novell's other product areas.

USER EXECUTIVES

BILL BAUTZ

Senior vice president and chief technology officer, New York Stock Exchange

The New York Stock Exchange is beefing up its network infrastructure, and Bautz is the man responsible for its design, development and implementation. His challenge: keep NYSE competitive without allowing a network outage.

USERS

DEBRA CHRAPATY

Chief media officer, E-Trade Technologies

As CIO, Chrapaty essentially built and managed E-Trade's technology infrastructure. In her new position, announced in October, Chrapaty's challenge is to help reach customers through PC alternatives, such as wireless devices. She'll likely attack this untapped market with characteristic gusto.

JOE DOUPNIK

Professor of electrical and computer engineering, Utah State University

Doupnik knows his NetWare, and he's not afraid to speak his mind. Among those who seek his sage advice are subscribers to his two list servers, and Novell, which frequently taps him to beta-test products. Doupnik's power is his influence: When he tells people to do something, they usually do.

NANCY GRIM

Vice president, American Express

One of Grim's jobs is to make it easier for companies to control spending and do away with paper-based authorizations in lieu of electronic procurement cards, or p-cards. As Web purchasing grows, Grim's challenge is to forge partnerships with software companies to make sure that American Express p-cards can be processed through modern e-purchasing methods.

ILLUSTRATION TAMARA GUION

JOHN SIDGMORE, VICE CHAIRMAN, MCI WORLDCOM

John Sidgmore tells a funny joke about how to reap millions by selling your company to one giant corporation after another. He should know. Under Sidgmore's leadership, UUNET grew from a $6 million company in 1994 to more than $3 billion today. Through merger after merger, Sidgmore remains the constant at UUNET, now, of course, as MCI WorldCom's Internet visionary.

MCI WorldCom needs Sidgmore's insight. With his guidance, the company is storming the international market in 1999, dumping more than $100 million of capital spending into Internet hosting centers (there are now 15 worldwide). The company also has developed one of the most aggressive service-level agreements, a state-of-the-art OC-48c backbone, virtual private networks and multicast services. Sidgmore is doing everything he can to push the envelope of IP network technology.

The next wave is airwaves, Sidgmore predicts. He was instrumental in MCI WorldCom's recent successful bid for Sprint, flying to Kansas City with Bernie Ebbers to get the talks rolling. The golden ring was the Sprint PCS business, not to mention taking out a major competitor.

The outspoken Sidgmore continues to proclaim that as far as the Internet is concerned, the enterprise hasn't seen anything yet. Wireless and multimedia will drive Internet growth off the charts, he preaches. And sitting in the driver's seat of one of the world's most powerful backbones, what Sidgmore sees, the world will receive.

MIKE VOLPI, SENIOR VICE PRESIDENT OF BUSINESS DEVELOPMENT AND GLOBAL ALLIANCES, CISCO

On Wall Street a man like Mike Volpi is known as a "deal maker." While Chambers' charisma gains the CEO most of the company's fanfare, it is Volpi's behind-the-scenes work that has significantly shaped Cisco's clout, particularly in the past two years. He's the one who shops for young budding companies to acquire. His finds have allowed Cisco to bolster its homegrown technology with a string of savvy technology purchases. In fact, he has lead Cisco in more than 40 acquisitions and 70 equity investments.

So far, his aim has been right on target. His coup de grâce was the consumption of IBM's Networking Hardware Division in October. That $2 billion deal eliminated one of Cisco's longest-standing rivals and handed Cisco a virtual monopoly in SNA/IP routing. Even with that deal, Volpi hasn't rested on his laurels. This year alone Cisco has purchased a dozen companies, and in the process, obtained a range of technologies: Internet customer management software, digital video broadcasting, SONET transport, digital subscriber line voice, voice application software and more.

Likewise, its purchase of wireless LAN equipment vendor Aironet Wireless is helping move the router maker into wireless. A growing arsenal of transport methods is necessary if Cisco expects to compete with the deep pockets and telecom know-how of Nortel Networks and Lucent.

This year, Volpi also controls strategic partnerships and alliances. Cisco counts seven fellow vendors as strategic allies (EDS, Hewlett-Packard, IBM, KPMG, Microsoft, Motorola and PeopleSoft). With these seven companies, Cisco spawns the bulk of its hard-core development work in Internet standards, applications and transport technologies from wireless to frame relay.

The upshot is, if you want to play with Cisco, you've got to get through Volpi. Volpi's power will only be enhanced if he learns to partner as well as he's learned to purchase. Yet don't look for him to stop making deals anytime soon. With its SNA-routing rival now vanquished, expect Cisco to try to take on the telecom vendor giants on their own turf — telephony. This deal maker will be looking to add more sweet telephony companies to Cisco's arsenal.

Continued on page 54

50 MORE PEOPLE WHO MAKE A DIFFERENCE IN ENTERPRISE NETWORKING

USERS

JOHN HICKEY
Senior technology officer, NASDAQ

The nation's fastest-growing stock exchange requires a stellar network. Hickey is in charge of NASDAQ's primary data center, where in November NASDAQ installed a Unisys 6800 system to keep up with the capacity of its new trading extranet. Currently, the extranet can handle up to four billion shares per day; it can be scaled to accommodate an eight-billion-share day.

MARK HOGAN
Group vice president, e-GM

Hogan is responsible for General Motors' e-commerce strategy as head of the new e-GM. Hogan's plan is to expand GM's diverse online efforts with suppliers and customers, and create a unified repository for sales, service, financing, marketing and R&D information.

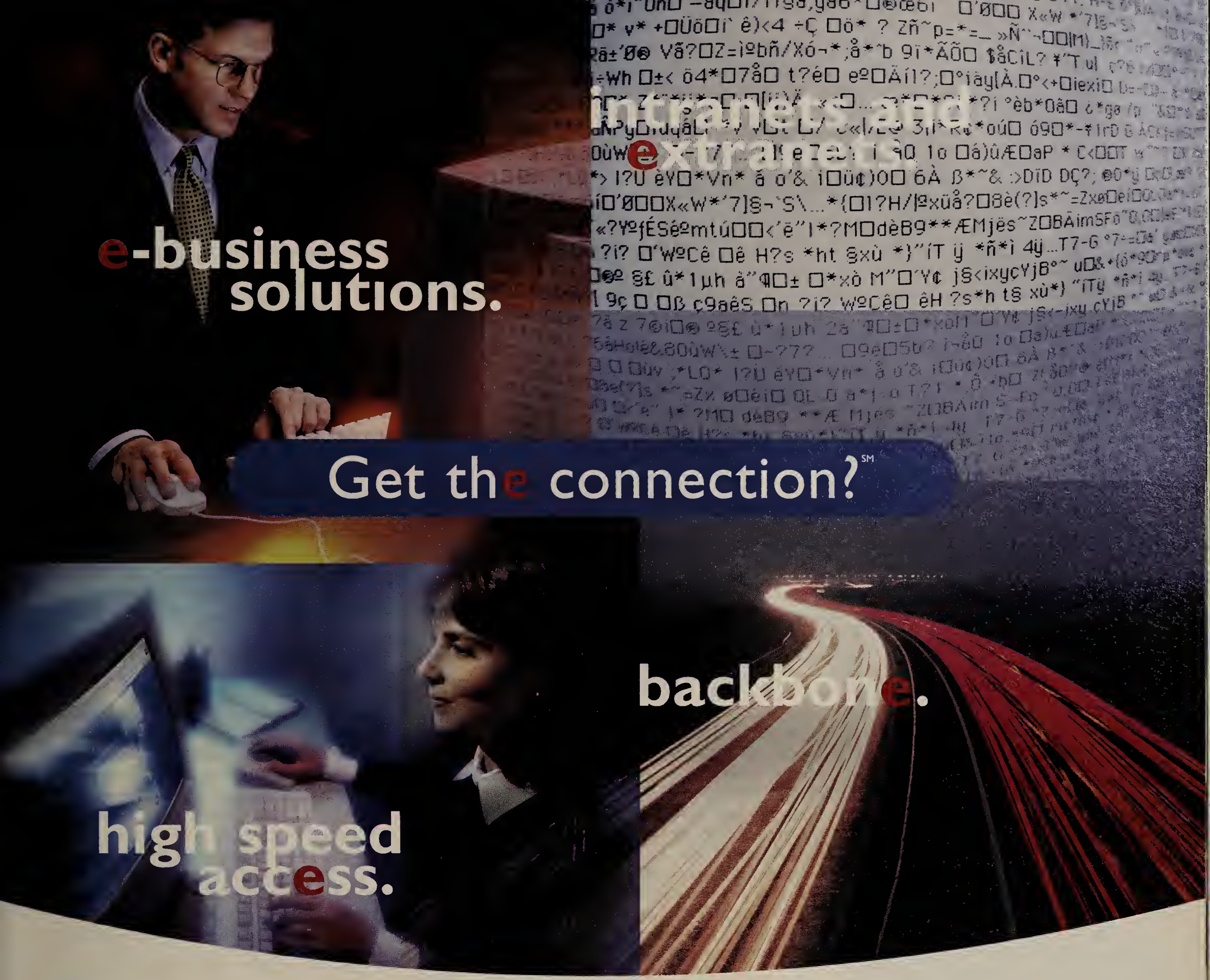
DAWN LEPORE
Vice chairman and CIO, Charles Schwab

Lepore helped Schwab move trading online, make it profitable and set the standard for online financial services. The vice chairman title she was awarded in July is an acknowledgment of Lepore's (and IT's) contribution to business.

RANDY MOTT
Senior vice president and CIO, Wal-Mart

Mott oversees Wal-Mart's Retail Link collaboration application, which is accessed by more than 7,000 suppliers seeking sales, inventory and shipping information. How much data are we talking? Try a new 101-terabit data warehouse — that's more than twice the size of the next-largest Fortune 500 data warehouse, Wal-Mart boasts.

ILLUSTRATION: JAY BEVENOUR



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Continued from page 52

ED WHITACRE, CHAIRMAN AND CEO, SBC COMMUNICATIONS

Ed Whitacre's well-orchestrated takeover of Ameritech cements him as a lean, mean Bell competitor. His style stems from the days when competitive local exchange carriers (CLEC) were a nuisance, but not a threat. Of course, in 1999, CLECs are not to be ignored, and the classic RBOC answer is to simply own more of the last mile.

That Whitacre does. With Ameritech secured as of November, SBC operates in more than half of the 50 states. That's the tally from acquisitions of Southwestern Bell, Ameritech, Pacific Bell, SBC Telecom and Nevada Bell. But Whitacre is no reactionary. He's clearly entered the age of competitive marketing, owning a string of other well-known brands: SecurityLink, SNET and Cellular One.

Through these brands, Whitacre aims to move into 30 top markets outside of SBC's traditional areas — a deal he struck with the Federal Communications Commission as part of the Ameritech merger. He's set his sights on Boston, Miami and Seattle within 2000, and already has lined up the appropriate regulatory nods. By mid 2001, he'll attack 12 more markets, including Atlanta, Denver and New York, and the company has declared it will reach all 30 markets within 30 months of acquiring Ameritech.

Whitacre plans to lure customers with high speeds. He's slated $6 billion to upgrade his network with fiber optics. That upgrade will reportedly affect 80% of SBC's customers. It's risky, given that SBC's regulated business would require opening up last-mile investments to CLEC competitors. But Whitacre has never shied away from competitors. On the contrary — he swallows them whole.

MICHAEL WILSON, CHIEF SCIENTIST, EBAY

EBay has truly gone where none have tread before, almost single-handedly creating consumer-to-consumer e-commerce, in large thanks to the creator of its architecture, Michael Wilson.

EBay's success has spawned innumerable copycats, and indeed, an entire industry. The mighty consumer sites of Yahoo and Amazon.com stumbled over themselves to add auction capabilities. Entire business-to-business auction sites also have been built. Thus, last year, eBay moved from phenomenon to establishment.

With that, Wilson's prestige has grown from notable to powerful. Not that he hasn't taken his hits this year. Like other trading networks, an auction system must have extremely high reliability. Because eBay sits on the leading edge for consumer-to-consumer trading, its reliability weighs heavily in the public eye. Last July, when it suffered a multiday crash, the industry coined a new term, an "eBay black-eye" — a big outage that costs big bucks.

And yet for millions, Wilson's architecture holds fast. In fact, eBay has more than 5.6 million registered users, lists almost three million items and adds more than 300,000 auctions per day. It conducts more than $1 billion of gross merchandise sales annually. And it conducts all of this business under the intense public scrutiny that few consumer-oriented e-commerce sites endure. Only the likes of Amazon.com and Yahoo are probably watched more closely.

Next up, Wilson must condense his network onto a Palmtop. In October, the company announced that eBay will be available to users of the Palm VII. This leads the way for a wave of wireless Internet access devices.

Likewise, the sensational success of eBay has caused the company to regionalize this year. It has now opened up about a dozen sites that serve specific metropolitan areas. These sites have decentralized Wilson's architecture, giving him the complexity that only comes from widely distributed systems.

He's now also grappling with the age-old problem of integrating an acquisition. In April, eBay acquired Butterfield & Butterfield, the fourth-largest auction firm in the world. Strategically, this move gives eBay the prestige it needs to penetrate into higher priced items, globally.

Wilson's challenge: to ensure that its high growth rate doesn't topple the network reliability that he's established. ■

50 MORE PEOPLE WHO MAKE A DIFFERENCE IN ENTERPRISE NETWORKING

STANDARDS-SETTERS

TIM BERNERS-LEE
Director, World Wide Web Consortium

Spinner of The Web, Berners-Lee is now the guy who makes sure his worldwide phenomenon stays open. He's committed to developing common protocols to ensure interoperability and protect the Web from proprietary interests.

BOB MOSKOWITZ
Senior technical director, International Computer Security Association

Much of today's security action revolves around IP Security (IPSec), and Moskowitz is knee-deep in the maturing security protocol. Involved first as a high-powered user at Chrysler, Moskowitz went on to become co-chair of the IETF's IPSec Working Group and subsequently joined the ICSA to work on IPSec certification programs.

JEFFREY SCHILLER
Area director for security, Internet Engineering Task Force

MIT network manager by day, Schiller is also the IETF's security man and co-heads the standards-setting body's Security Area. He sifts through political infighting and helps move the best security standards forward.

ERIC RAYMOND
President, Open Source Initiative

Raymond's open source expounding helped fuel industry interest in open source poster child Linux, particularly after he published Microsoft's notorious anti-open-source memos back in late 1998. Since then, Raymond has gone on to champion open source advocates and chastise opponents though the Open Source Initiative.

ILLUSTRATION TOM BACHTELL

Award Winning

Gigabit Routing

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* Workgroup Switch for High Bandwidth Applications

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* Legacy Networks Accelerated to Gigabit Performance

* 10/100/1000Mbps Networks with ATM Overlay

* Replace FDDI Using Existing Multimode Infrastructure

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1999 POWEROMETER

CEO power

Factoid: Three of the 25 CEOs on our list are new to their position this year, whereas last year we had six newcomers. The total of nine means that more than one-third of these companies have changed CEOs within the past two years.

It's not easy to stay powerful.

That's the message behind this year's CEO Powerometer rankings, which saw 16 of the 25 CEOs lose power as compared with last year, 10 of them by five points or more. OK, three of them actually lost power as compared with the CEO they replaced in the past year, but still — that's close to an indictment of this entire group.

The most notable exception is Scott McNealy. The Sun chief jumped four positions on the Most Powerful CEOs chart, to No. 3, and came out on top of the CEO Power Gain Index in terms of the largest improvement vs. last year. He is also one of only three CEOs, Bill Gates and Hewlett-Packard's Carly Fiorina being the others, who has a better Power Predictor score this year than last. Fiorina, however, is being compared against Lew Platt, her predecessor.

As with the company ratings, the CEO Power Gain Index is derived by subtracting the percentage of respondents who said a CEO lost power in the past year from the percentage who said a CEO gained power. The CEO Power Predictor uses the same formula, but respondents are asked to state whether they think a CEO will gain or lose power in 2000.

McNealy's strong Power scores can be interpreted as a vote of confidence in his thin-client, anti-Microsoft stance, as well as his alliance with Netscape for Web and groupware software. The fact that he's a colorful, funny guy doesn't hurt, either. If you've ever seen him speak, and if you're not crazy about Microsoft, you'd probably be inclined to give him a high score.

Other than McNealy, Fiorina and Cisco's John Chambers are the only CEOs to score better this year than last on the Power Gain chart. But again, Fiorina is actually being compared to Platt. The rest had the same or lower Power Gain figures than they did last year. Ouch.

On the Most Powerful CEOs chart, Gates once again comes out on top by a comfortable eight-point margin over second-place Chambers. However, we conducted the survey in October — before Judge Thomas Penfield Jackson ruled that Gates didn't play by the rules. Chambers would be justified in feeling good about his chances at finally topping Gates next year.

MCI WorldCom's Bernie Ebbers jumped five spots on the Most Powerful CEOs chart, to No. 9, while two other CEOs — Charles Wang of Computer Associates and John Roth of Nortel Networks — moved up four positions, to No. 12 and 15, respectively. Wang was also one of only five CEOs who didn't fare worse this year than last on the Power Gain chart — he was dead even with an index of 9.2, although it's hard to get too excited about coming in 19 out of 25. Not much in any of the other Power indicators explains

MOST POWERFUL CEOs

We asked 250 *Network World* readers to rate the CEOs on a power scale of one to 100, with 100 being the most powerful. The Power Rating is the mean of all reader responses.

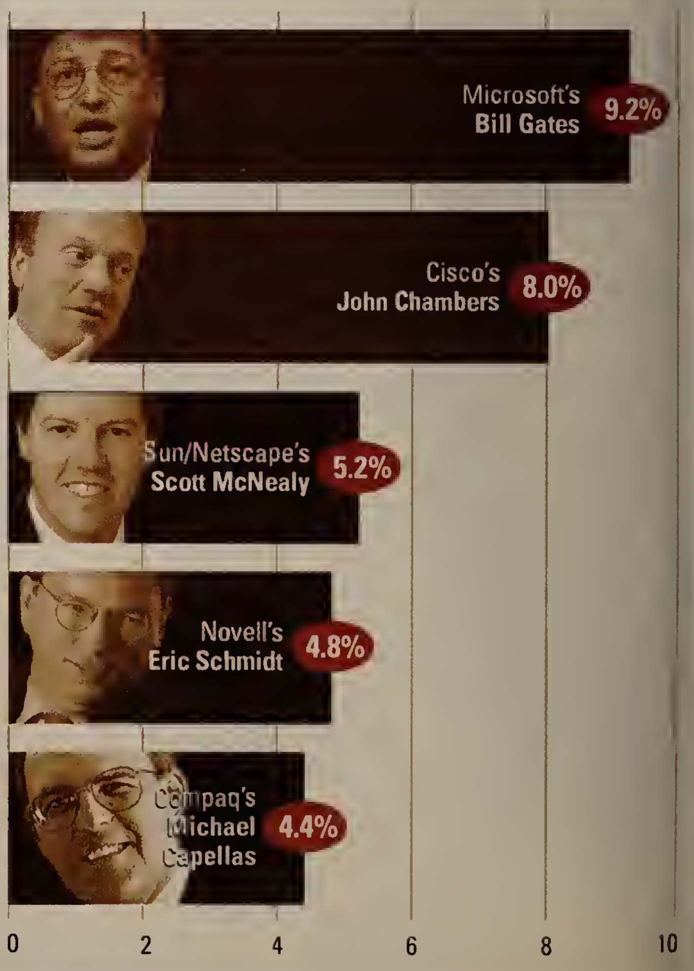
			1999 Power rating	1998 Power rating	Gain/loss	1998 Rank
1	**Bill Gates**	Microsoft	80.4	79.5	1.20	1
2	**John Chambers**	Cisco	72.4	69.9	3.49	2
3	**Scott McNealy**	Sun/Netscape	66.7	61.1	8.35	7
4	**Lou Gerstner**	IBM	65.2	64.4	1.35	4
5	**C. Michael Armstrong**	AT&T	64.3	62.4	2.88	5
6	**Craig Barrett**	Intel	63.0	65.2	-3.55	3
7	**Larry Ellison**	Oracle	61.8	61.0	1.36	8
8	**Rich McGinn**	Lucent	60.9	61.5	-0.99	6
9	**Bernard Ebbers**	MCI WorldCom	59.8	57.5	3.90	14
10	**Eric Schmidt**	Novell	58.6	60.4	-3.11	10
11	**Carly Fiorina***	Hewlett-Packard	57.2	59.0	-3.16	12
12	**Charles Wang**	Computer Associates	54.0	52.1	3.61	16
13	**Eric Benhamou**	3Com	53.9	60.7	-12.66	9
14	**Bill Esrey**	Sprint	51.8	52.2	-0.75	15
15	**John Roth**	Nortel Networks	50.3	50.7	-0.79	19
16	**Duane Ackerman**	BellSouth	47.5	51.0	-7.35	17
17	**Michael Capellas***	Compaq	46.5	59.3	-27.54	11
18	**Ivan Seidenberg**	Bell Atlantic	45.1	50.9	-12.98	18
19	**Charles Lee**	GTE	45.1	49.2	-9.24	20
20	**Bill Larson**	Network Associates	44.6	48.7	-9.17	22
21	**Joseph Nacchio**	Qwest**	43.3	N/A	N/A	N/A
22	**Sol Trujillo**	US West	38.9	42.5	-9.13	25
23	**Ed Whitacre**	SBC	38.0	46.3	-21.80	24
24	**Piyush Patel***	Cabletron	37.5	49.2	-31.19	20
25	**Terry Matthews**	Newbridge Networks	32.5	41.9	-28.73	26

* Was not CEO when 1999 survey was conducted; rankings denote scores for previous CEO.

** Company was not surveyed last year.

POWER FAILURE

We asked respondents what single CEO, by dint of his or her position in the industry, should have more influence but doesn't.



failure

Our annual reader poll of the most powerful net executives casts doubt on many a leader's ongoing might.

BY PAUL DESMOND

Roth's jump in the Most Powerful list, so we'll chalk it up to the generally good year Nortel had, with a steadily climbing stock price.

A few other CEOs are notable for their decidedly poor power ratings, and two of them are CEO newcomers: Michael Capellas of Compaq and Piyush Patel of Cabletron. While perhaps it's a little unfair to compare their scores to those of their predecessors, the fact is these CEOs have to play the hands they were dealt. In terms of power, both hands are losers.

Capellas pays the price for Compaq's well-documented struggle to turn itself into a services organization following its Digital and Tandem acquisitions, its floundering PC sales and its tumbling stock price. Capellas, who was appointed CEO in July, joined the company as chief information officer less than a year prior.

Cabletron carries the distinction among this power crowd of being the first company to have a different CEO three years in a row. This year's model, Patel, isn't faring so well. He had the largest drop in the Most Powerful CEOs rating vs. last year, coming in 31.19 points behind his predecessor, Craig Benson, and moving down four spots on the list as a result. Benson replaced Don Reed, who replaced Bob Levine.

Patel was dead last on the Power Predictor and next-to-last on the Power Gain chart, right above GTE's Charles Lee, whose future will be uncertain should Bell Atlantic's planned acquisition of his company happen.

To be fair, however, it should be noted that respondents apparently had some trouble with the Power Gain and Predictor questions when it came to CEOs. For example, on average more than half the respondents answered "Don't know" or "No" when asked about any given CEO. The nonresponse figure was just 28.9% on average for the company Power Gain questions.

Therefore, it stands to reason that the CEOs who fare best in this category are those with the highest profile: Chambers, Gates, McNealy, Ebbers and C. Michael Armstrong. HP's Fiorina, the only woman on the list, comes in sixth, perhaps riding the wave of publicity she received upon being appointed to the top spot two months before the survey was conducted.

One CEO who doesn't have name recognition problems but nonetheless didn't fare well is Eric Benhamou. He dropped four rungs on the Most Powerful CEOs chart, to No. 13, and had the third-largest drop (12 percentage points) from last year on the Power Gain chart. Respondents expect more of the same next year, as his Power Predictor score is 15.2 points lower than last year, the second-highest drop. Apparently respondents are hearing the talk that 3Com is a takeover target, a buzz that grew loud in late summer when the company's stock was trading in the low-20s. 3Com stock has since rebounded to the mid-30s but is far below the $50+ high of late 1998. Maybe respondents figure that, for one reason or another, Benhamou won't be calling the shots much longer.

CEO POWER GAIN

		1999 Index	1998 Index	Gain/loss
John Chambers	Cisco	42	41.4	0.6
Bill Gates	Microsoft	30.4	44.2	-13.8
Scott McNealy	Sun/Netscape	29.6	21.2	8.4
Bernard Ebbers	MCI WorldCom	25.2	35.6	-10.4
C. Michael Armstrong	AT&T	23.6	29.6	-6
Carly Fiorina*	Hewlett-Packard	22.8	18	4.8
Lou Gerstner	IBM	22.4	23.6	-1.2
Larry Ellison	Oracle	22.4	23.6	-1.2
Craig Barrett	Intel	21.2	30.4	-9.2
Rich McGinn	Lucent	20.8	32	-11.2
John Roth	Nortel Networks	13.6	18.4	-4.8
Joseph Nacchio	Qwest**	13.6	N/A	N/A
Eric Benhamou	3Com	12.8	24.8	-12
Bill Esrey	Sprint	12	13.6	-1.6
Ivan Seidenberg	Bell Atlantic	10.8	17.6	-6.8
Eric Schmidt	Novell	10.4	20.4	-10
Duane Ackerman	BellSouth	10	10	0
Bill Larson	Network Associates	9.6	16	-6.4
Charles Wang	Computer Associates	9.2	9.2	0
Ed Whitacre	SBC	6	10.4	-4.4
Sol Trujillo	US West	2	5.2	-3.2
Michael Capellas*	Compaq	1.2	24.4	-23.2
Terry Matthews	Newbridge Networks	0.8	8	-7.2
Piyush Patel*	Cabletron	0	1.2	-1.2
Charles Lee	GTE	-0.8	7.2	-8

* 1999 Index reflects predecessor's score. ** Not on last year's list.

CEO POWER PREDICTOR

		1999 Index	1998 Index	Gain/loss
John Chambers	Cisco	37.6	40.8	-3.2
Bill Gates	Microsoft	32.8	28.4	4.4
Scott McNealy	Sun/Netscape	29.6	25.6	4
Larry Ellison	Oracle	25.6	31.6	-6
Bernard Ebbers	MCI WorldCom	25.2	31.6	-6.4
C. Michael Armstrong	AT&T	24.4	34	-9.6
Lou Gerstner	IBM	24	28.4	-4.4
Craig Barrett	Intel	24	35.2	-11.2
Carly Fiorina*	Hewlett-Packard	27.2	24.4	2.8
Rich McGinn	Lucent	22	33.6	-11.6
Joseph Nacchio	Qwest**	14.8	N/A	N/A
John Roth	Nortel Networks	13.6	20	-6.4
Eric Benhamou	3Com	12.4	27.6	-15.2
Ivan Seidenberg	Bell Atlantic	12.4	16.8	-4.4
Charles Wang	Computer Associates	11.6	12	-0.4
Duane Ackerman	BellSouth	11.2	11.6	-0.4
Eric Schmidt	Novell	9.6	20.4	-10.8
Bill Larson	Network Associates	8.8	14.8	-6
Ed Whitacre	SBC	7.2	14	-6.8
Bill Esrey	Sprint	6	18.8	-12.8
Michael Capellas*	Compaq	4.8	24	-19.2
Sol Trujillo	US West	2.8	6.4	-3.6
Terry Matthews	Newbridge Networks	1.6	5.6	-4
Charles Lee	GTE	0.4	8	-7.6
Piyush Patel*	Cabletron	0	0.8	-0.8

* 1999 Index reflects predecessor's score. ** Not on last year's list.

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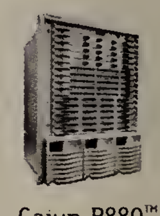
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The money guys

Who are the most powerful venture capitalists in networking, and what are their investment strategies?

BY SUSAN MARKS

If money equals power, the nation's venture capitalists wield colossal clout.

In the first three quarters of this year alone, venture capitalists poured almost $22 billion into U.S. companies, in more than 2,720 deals, according to a PricewaterhouseCoopers Money Tree Survey. Drawn by expanding technologies, exploding markets and phenomenal investment returns, these venture capitalists poured more than half of that money into computer networking, communications and Internet companies.

"Over the last three years, venture capital firms on average have returned between 25% and 35% per year," says Kirk Walden, director of PricewaterhouseCoopers' Money Tree project in Austin, Texas. "Some are returning 100% or 200%, and they're not even Ponzi schemes. They're legitimate businesses."

Plus, the funding frenzy shows no sign of abating.

"We wouldn't say next year would match the three times [growth in communications and networking], but we wouldn't be surprised," says Steve Meisel, global practice leader of PricewaterhouseCoopers' computers and networking practice.

"It's red-hot today. It's likely to get even more intense over the next 12 months," says Jim Breyer, managing partner of venture capital powerhouse Accel Partners in Palo Alto. Accel has $1.4 billion invested in communications and Internet businesses, and Breyer himself has backed two big winners this year, Foundry Networks and Redback Networks.

Be that as it may, money is the least of what a venture capitalist provides a start-up, says Todd Dagres, general partner with Battery Ventures in Wellesley, Mass. "One of my entrepreneurs calls me the blue-collar venture capitalist because I roll up my sleeves and do whatever I need to do," he says. "My first hat is that of a financier. My second hat is that of a headhunter, and my third hat is working on positioning."

Dagres must be on to something: One of his companies is Akamai Technologies, whose October IPO turned Battery's $5 million investment into $1.8 billion in a year's time.

Venture capitalists today are raising bigger funds, and entrepreneurs are taking more money from them at slightly higher prices, Dagres says. That translates into inflation in terms of the amount of money available and the amount being invested. And as venture capitalists scramble to get into the first round of funding these start-ups, competition intensifies.

Some venture capitalists have a get-in/get-out strategy — fund a start-up, work with it until it goes public or is bought out, then make a quick and profitable exit.

Other venture capitalists tend to stick around. "The very biggest returns are often well after the initial public offering," Accel's Breyer says. "Just this year, Redback Networks, Foundry and RealNetworks are all up more than five times. The right economic decision is very often to stick with a company. Where else can we make five times our money in 11 months?"

Accel's goal, Breyer adds, is to make 50 to 100 times its money over a five- to seven-year period.

New Enterprise Associates (NEA), a Menlo Park, Calif.,

Continued on page 62

ILLUSTRATION: RICHARD LILLASH

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Continued from page 59

venture capital firm, also stays with its companies, says co-founder C. Richard Kramlich. He points to NEA's relationship with Ascend Communications as an example.

NEA invested in Ascend in 1991, and even after the firm made distributions to its partners, Kramlich remained on Ascend's board of directors. Lucent bought the company this year for $23 billion. "That's kind of the all-time high watermark for a technology deal," Kramlich says.

"What I think has been notable about this year is the realization of liquidity events earlier in the companies' life cycles," he says. Companies such as Juniper Networks and Cerent go public and are acquired by the major players at younger stages and at higher prices, he says.

POWER VENTURE CAPITALISTS

Here are some of the top VCs and a sampling of the companies they have funded:

Jim Breyer, 38

Managing partner, Accel Partners, Palo Alto

www.accel.com

Actuate, Agile Networks (acquired by Lucent), Arbor Software (now named Hyperion Solutions), Centrum (acquired by 3Com), Collabra (acquired by Netscape), Corsair Communications, Foundry Networks, Macromedia, Redback Networks

Todd Dagres, 39

General partner, Battery Ventures, Wellesley, Mass.

www.battery.com

Akamai Technologies, Convergent Networks, Equipe Communications, Redstone Communications (Unisphere Solutions/Siemens), XCOM Technologies (acquired by Level 3 Communications)

John Doerr, 48

Partner, Kleiner, Perkins, Caufield & Byers (KPCB), Menlo Park, Calif.

www.kpcb.com

Compaq, Intuit, Lotus, Macromedia, Netscape, Sun, Symantec

Timothy Draper, 42

Founder and managing director, Draper Fisher Jurvetson, Redwood City, Calif.

www.dfj.com

CellNet Data Systems, eFax.com (formerly JetFax), Four11 (acquired by Yahoo), GoTo.com, Tumbleweed Communications

Kevin Fong, 42

Managing general partner, Mayfield Fund, Menlo Park

www.mayfield.com

Alantec (acquired by FORE Systems), Crescendo Communications (now Cisco Workgroup Systems Business Unit), Legato Systems, Rapid City Communications

Robert Kagle, 42

Founder, Benchmark Capital, Menlo Park

www.benchmark.com

Ariba, eBay (not a network company, but worth noting: A 22% stake in eBay bought in 1997 for $5 million is worth about $2.5 billion today — a 49,900% return), Approach Software (acquired by Lotus), Red Hat Software, Viasoft

Vinod Khosla*, 44

Partner, KPCB

www.kpcb.com

Cerent (acquired by Cisco), Concentric Network, Corio, Daisy Systems, Juniper Networks, Qwest, Siara Systems, Sun

*See 25 Most Powerful People in Networking, page 44.

C. Richard Kramlich, 64

Co-founder and general partner, New Enterprise Associates, Menlo Park

www.nea.com

Ascend Communications (Lucent), Com21, Juniper Networks, NetSolve, Silicon Graphics

Don Valentine, age undisclosed

Founder, Sequoia Capital, Menlo Park

www.sequoiacap.com

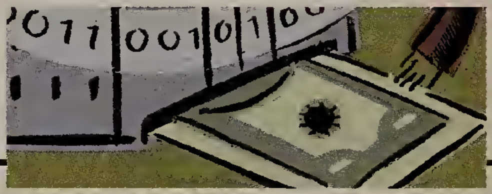
Apple, C-Cube, Cisco, National Semiconductor, Network Appliance, Oracle

John Walecka, 40

Founding partner, Redpoint Ventures, Menlo Park

www.redpointventures.com

Agile Networks (acquired by Lucent), Network Equipment Technologies, On-stream (acquired by 3Com), Rhythms Net-Connections, Sybase, Synernetics (acquired by 3Com), Transmedia Communications (acquired by Cisco), Wellfleet, Xylan



IN THE COMPANY OF BILLIONAIRES AND ANGELS

All this money going to Silicon Valley and beyond also has left its mark on venture capitalists' personal portfolios. A number tally their wealth in the hundreds of millions of dollars; a few rank as billionaires. This year, *Forbes* ranked venture capitalist elder statesman Arthur Rock, 73, No. 174 on its "400 Richest Americans" list, with an estimated net worth of $1.4 billion. Among his successes are Apple, Fairchild Semiconductor, General Transistor, Intel, Scientific Data Systems and Teledyne.

Another billionaire — new to the *Forbes* list for '99 — is high-profile venture capitalist John Doerr, a partner at Kleiner, Perkins, Caufield & Byers (KPCB) in Menlo Park. *Forbes* ranks Doerr No. 243, with an estimated net worth of $1 billion. KPCB has had its hand in the creation of more than 100 publicly traded companies and has raised more than $1.2 billion in capital, which it has invested in companies with more than $80 billion in market capitalization.

Today, more than 500 active venture capital firms and thousands more "angel" investors — people who sink their own money into ventures — are funding companies. Angels can be "friends and family," as one venture capitalist analyst puts it.

Besides money, angels give advice, says Jim Dow, founder of MicroCom, which he sold to Compaq in 1997. Dow, now a Boston-area angel, funds telecom and Internet infrastructure companies. He invests anywhere from a few hundred thousand dollars to a few million in a company, then generally sits on the board of directors and often mentors the CEO.

Another angel is Paul Allen, Microsoft co-founder and billionaire — he's No. 2 on *Forbes'* "400 Richest Americans" list, behind Bill Gates. Allen, with a net worth of $40 billion, may not be an angel in the purest sense because he also invests through his venture capital firm, Vulcan Partners. But his pockets are deep, and he's willing to invest in technology. An example of his largess: In June, Vulcan and MCI WorldCom anted up $300 million to help Metricom, a leading provider of mobile data networking and technology.

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Other Silicon Valley angels include Ron Conway, founder of Angel Investors LP and its two venture capital funds totaling $175 million; and Gary Bowen, a former Bay Networks executive.

Any list of 1999 venture capitalist notables also would have to include Bandel Carano with Oak Investment Partners — his résumé includes the successful funding of a range of network companies, from Actel to Wellfleet Communications; Paul Ferri at Matrix Partners — his scores include Cascade Communications, Sycamore Networks and Wellfleet. And then there's Geoff Yang, a founding partner of Redpoint Ventures, a Menlo Park firm launched this fall from a merger of Institutional Venture Partners and Brentwood Venture Capital. He's a power player, with deals such as Foundry and Juniper.

Many of today's venture capitalist power brokers hardly fit the mold that comes with the term "old timers." And they likely will be around wielding bucks and brains for a long time. Nonetheless, a new crop of venture capitalists is popping up.

"What we are seeing is a new generation of venture capitalists who have very specific expertise within networking and communications," Accel's Breyer says. He cites Accel's own Peter Wagner, a 33-year-old general partner who led the firm's investment in Northpoint Communications; his network franchise focuses on service businesses and optical networking. Another example is Peter Morris, a 40-year-old general partner at NEA who specializes in data networking. Other names and faces worth remembering are Roland Van der Meer of Communications Ventures and Steve Jurvetson at Draper Fisher Jurvetson.

The money guys, they keep a comin'.

Marks is a freelance writer in Littleton, Colo.

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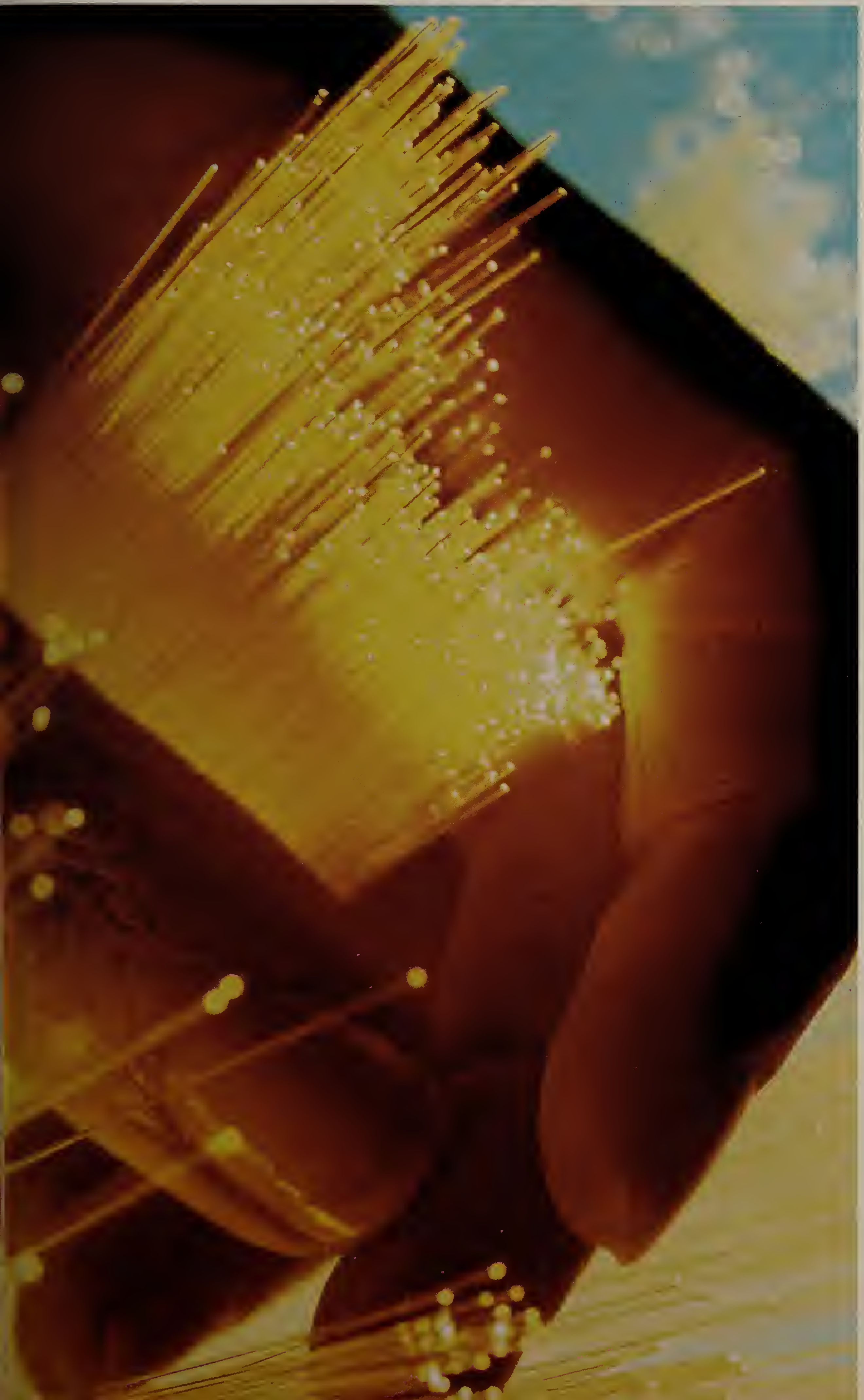

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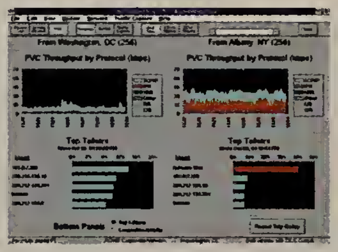

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Power in politics

HIGH-TECH HITS THE BIG TIME IN THE 2000 PRESIDENTIAL RACE.

BY DEBORAH RADCLIFF

It's happy hour in Sacramento, the California capital, and Vice President Al Gore is ensconced in a private, back-office meeting with 25 high-tech movers and shakers. Among them: John Doerr, partner with Kleiner, Perkins, Caufield & Byers (KPCB), the venture capital powerhouse; Mark Andreessen, Netscape founder; and Steve Westly, vice president of business development for fast-growing eBay.

Over pizza and beer, they're talking politics, Silicon Valley style: education reform, encryption controls and research and development.

"Al Gore has been coming out here nearly every month for the past three years to meet informally with people he calls Gore techs," Westly says. "He sets aside pomp and circumstance and talks about issues that matter to us."

Gore is not the only candidate meeting with high-tech minds. George W. Bush and Bill Bradley are all over the Bay Area and other high-tech pockets around the country. As for John McCain, well, let's just say he's had an ear open to the tech community ever since his January 1997 nomination as chair of the Senate Committee on Commerce, Science and Transportation.

The high-tech industry is growing up politically. And nowhere is the rising political influence of the tech community more evident than in election 2000. Just take a look at the leading candidates' Web pages. Right under education and social security reforms, the presidential candidates have posted a number of technology policy issues on everything from Internet taxation to encryption and the workforce shortage.

But of the candidates who claim counsel among high-tech leaders, Bush, the Republican Texas governor, has been the only one to install a formal technology advisory committee. He did so in June.

Meanwhile, three other leading bipartisan candidates — McCain, a Republican senator from Arizona, and Democrats Gore and former New Jersey Senator Bill Bradley — have no formal technology policy advisory committees. But all have their own ways of gleaning advice from the industry's power elite.

POWERING BUSH'S TECH CAMPAIGN

Bush's list of top advisors reads like a high-tech who's who: Michael Dell, chairman, Dell; Tom Engibous, president, Texas Instruments; Robert Herbold, executive vice president, Microsoft; John Chambers, president and CEO, Cisco; Ray Lane, president, Oracle; Carol Batz, CEO, Autodesk; Richard Egan, founder, EMC; James Barksdale, managing partner, Barksdale Group; and Steve Papermaster, CEO, Agillon.

Bush caught the technology wave relatively early. In 1996, his administration formed the Texas Science and Technology Council. And around the same time, he passed a research and development tax credit in Texas that has helped his state draw high-tech companies to areas around Austin, Dallas and Houston.

"Bush sees the difference between the things the government can help with and things the government shouldn't get involved with at all," says Floyd Kvamme, a KPCB partner, a Bush technology policy advisor and a member of the board for the Technology Network in Silicon Valley.

Internet taxation is a particular hot button for Bush and other candidates this election season because the three-year moratorium on it is set to expire in October 2001. Bush and his e-business-minded tech advisors realize Internet taxation is

ON THE BALLOT

	Web site	Technology platforms	Technology advisors
DEMOCRATS			
Al Gore 	www.algore2000.com	• Targeted technology investments • Privacy • Child protections online • Connect schools to the Internet* • Expand crime-fighting computer technology*	None; but met with high-tech luminaries on a quarterly, near monthly basis until the onset of fourth when he got busy with the campaign.
Bill Bradley 	www.billbradley.com	• Internet as a grass-roots political platform • For Internet deregulation; consumer rights* • Voted for V-Chip and telecom self-censorship*	None formally, but is friends with a number of high-tech entrepreneurs; spent a year in Silicon Valley as a guest lecturer at Stanford University.
REPUBLICANS			
George W. Bush 	www.georgewbush.com	• Make the Internet duty-free • Combat piracy of American ideas and intellectual property • Develop international standards for e-commerce • Ease export controls on encryption • R&D tax credits • Raise limits on H-1B visas	Several, including Michael Dell, chairman, Dell Computer; Robert Herbold, executive vice president, Microsoft; John Chambers, president and CEO, Cisco; Ray Lane, president, Oracle; James Barksdale, managing partner, Barksdale Group.
John McCain 	www.mccain2000.com	• Against Internet taxes • H-1B visa program is not enough; eliminate artificial limits • Job training • Technology and e-commerce "single most important thing for Congress" next term • Ease encryption export controls	None, but as chair of the Commerce Committee, he's in touch with a number of high-tech leaders and issues.

SOURCES • WWW.ISSUES2000.ORG

inevitable, and they want to make sure it's done fairly, Kvamme says. But other candidates favor extending the moratorium while issues of interstate and foreign taxation are ironed out. And McCain favors a permanent ban on Internet taxation altogether.

"Conservatives tend to favor extending the moratorium, perhaps indefinitely. But state and local governments are deeply concerned that they will lose a vital source of revenue as sales migrate to the Internet," explains Christopher Yukins, a partner with Holland and Knight, a Falls Church, Va., firm specializing in tax law. "Businesses and politicians are caught in the middle. Many business people would accept taxes on Internet transactions so long as the system was fair and reasonably 'administerable.'"

Another barrier to e-commerce is encryption export regulations. This is where Bush makes a strong statement in favor of easing export controls.

In a written statement on his Web site, Bush says the current export control system is broken. His solution: "Set a common-sense export policy that places priority on safeguarding our national security while allowing American companies to sell products in the international marketplace."

Kvamme doesn't say how Bush will reconcile the two opposing forces: business interests vs. law enforcement's antithesis of hard-to-crack encryption. But he does say that lifting encryption export rules would actually help law enforcement because weak encryption makes it easier for bad guys to intercept and decrypt private messages.

"I don't really see a president being able to reconcile this," says Harris Swartz, director of information security at Road Runner, an ISP in Herndon, Va., and board member of the recently formed Digital Privacy and Security task force. DPS, a political steering committee under the Center for Democracy and Technology in Washington, D.C., will make recommendations to the new administration.

Referring to the Clinton administration's September announcement that it would release details on plans for relaxing export controls after Congress' winter break, Swartz says: "The whole issue and recent legislation raising export restrictions is great for those who sell encryption. It's also great for protecting sensitive information over the Internet. But when you look at the criminal side, you get into trouble."

GORE'S PRIVATE POWER MEETS

While Swartz is cautionary, the Business Software Alliance (BSA) in Washington, D.C., hails Gore for

Continued on page 68

THINGS THEY ARE A CHANGIN'

Politics come to high technology

Like it or not, Silicon Valley executives have started to realize there is something to what's going on inside state capitals and in the Beltway.

"The demographic of the typical technology executive is the Libertarian. They tend not to get involved in politics because they're more driven to create — it's their day and night job. But that's changing," says Becca Gould, vice president of public policy for the Business Software Alliance (BSA) and former counsel to the House Commerce Committee. "Tech executives are becoming more political because software and high tech is driving the U.S. and the world economy."

According to a July report by the Department of Commerce, technology growth accounted for one-third of economic growth in the U.S. between 1995 and 1998.

"In less than five years, look what's happened. It's an entirely new economy with new forces driving that economy and impacting change throughout the world. Whenever that happens, Congress starts to get more involved," says Bill Calder, spokesman for Intel, which has had lobbyists in Washington for the past 15 years.

A handful of pioneering groups — the BSA, the IEEE-USA and the Semiconductor Industry Association among them — have been on Capital Hill for more than five years. But the true techno-political renaissance began only two years ago when tech businesses galvanized in California to defeat Proposition 211 (known as the frivolous lawsuit proposition). Proposition 211 had been put on the ballot by shareholders and trial attorneys to make it easier to sue high-tech start-ups with poor stock performance.

"Like a sleeping giant, Silicon Valley awoke and said, 'This is not good for research and development. High tech is the driver of our national economy,'" says Steve Westly, vice president of business development for eBay and a member of the Democratic National Committee.

Proposition 211 gave birth to the highly political, Silicon Valley-based Technology Network, a membership group representing more than 140 high-tech firms. It offers financial and advisory support for bipartisan politicians.

— BY DEBORAH RADCLIFF

Guess who's leapfrogged the industry.
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Continued from page 66

leading this legislative effort. "I put this all under the banner of promoting e-commerce. Encryption controls are an inhibitor to the Internet developing further and puts those using the Internet at risk," says Becca Gould, vice president of public policy for the BSA.

Through his informal dialogs, the vice president has had an earful from the tech community. And one of the other things his tech advisors are telling him to support is permanent R&D funding for technology development. "In Silicon Valley, funding basic research at the universities is what led to the semiconductor. It's what gave us the technology for the Internet," eBay's Westly says.

And so, on his Web page, Gore takes a position in favor of R&D investments and tax credits to foster high-tech growth.

His support for permanent tax incentives makes one influential tech group, the IEEE-USA, particularly happy. Without tax incentives (which all candidates actually favor), technology companies would not be able to withstand the losses often involved with research, says Paul Kostak, IEEE-USA's president.

"Until now, the R&D tax credits come up every year. Members of Congress have told me point blank that it's an image thing for them. If they pass a tax credit every year, it makes them look good," Kostak explains.

MCCAIN FEELS INDUSTRY'S PAIN

While the IEEE-USA will not directly advise a presidential candidate because it looks like an endorsement, it is trying to assert some authority on an issue near and dear to it: the H-1B visa foreign worker program. Obtaining an H-1B visa is a cumbersome, red-tape-wrapped process in which many a temporary worker gets lost, Kostak says in explaining why the IEEE-USA sent an open letter to President Clinton requesting that the program be fixed.

As chair of the Commerce Committee, McCain helped raise the number of H-1B visas from 65,000 to 115,000 as a temporary fix to the labor shortage. But while McCain and the other candidates support raising the bar on H-1B visas, the 225,000-member IEEE-USA would rather see foreign technology workers enter the U.S. under America's permanent employment visa program because half of those permanent employment visas — around 60,000 — go unused each year.

John Raidt, McCain's policy director, says the senator would address this problem by offering an unlimited number of H-1B visas until the year 2006 and use the money raised in visa fees to improve technology education domestically. McCain touches on one of the biggest work force issues among the tech community, which for the most part favors training and education over importation. But changing the educational system would be a monumental task.

According to the Department of Education's National Center for Educational Statistics in Washington, D.C., some 24,768 technology-related bachelor's degrees were awarded in the 1996-1997 school year. This number is up slightly from previous years, but actually lower than the 1990-1991 school year, in which 25,083 such degrees were awarded. In the meantime, the Bureau of Labor Statistics estimates that more than

Continued on page 70

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Continued from page 68

one million technical jobs will need filling by 2005.

Because women made up only about one-third of those graduates (6,731 in 1996-1997), Washington-based Women in Technology International would like the candidates also to address training and education of women and minorities, says Carolyn Leighton, WITI's president. But this is lacking in all presidential candidates' campaign statements. Like the IEEE and the BSA, WITI does not directly advise candidates, although it does provide candidates with its wish list.

BRADLEY DOES STANFORD

While Bill Bradley campaigns for education improvements, he doesn't focus on the technology training issue. Rather, his entire technology platform, such that it is, centers on the Internet.

"I spent a lot of time educating Bill Bradley on his Internet strategy — how he can use it in his campaign by bringing people to his Web site," says Ted Schlein, advisor and friend to Bradley, and a KPCB partner. "Last time he came to San Jose, he must have said 'www.billbradley.com' about 15 times. I smiled."

Although Bradley states no technology policy platforms beyond Internet deregulation, consumer rights and limiting media ownership, Schlein maintains that Bradley has gained strong support in the tech community. He points out that Bradley lived among the Valley's power elite while guest lecturing at Stanford University in Palo Alto in 1997.

And surprise, surprise, tech leaders aren't necessarily interested in technology platforms. Many agree that technology policy issues are only a small part of what the high-tech community will vote on.

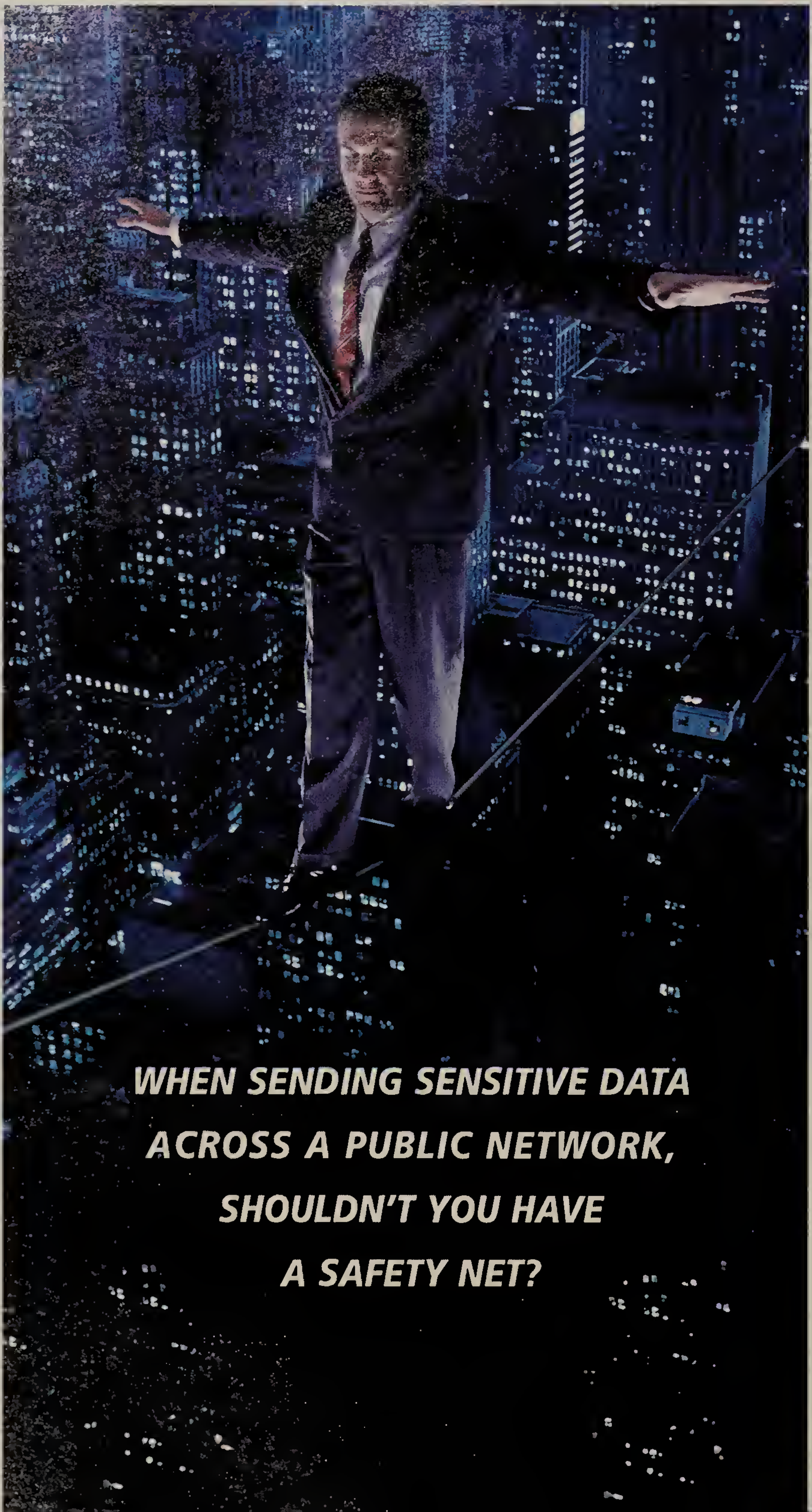
"It's often written in the press that debate on H-1B visas will get the support of Silicon Valley. That can't be farther from the truth," eBay's Westly says. "The issues Silicon Valley look at are a lot broader — pro-choice, pro-education, pro-environment and responsible financial aid, to name a few."

As such, Westly continues, technically savvy voters will ultimately judge candidates on their other positions and affiliations. He adds: "If candidates are close to the National Rifle Association, big tobacco or the extreme religious right, those are the political philosophies that would make a candidate an anathema in the Valley."

But because of their contributions to the network revolution of the '90s, those in the tech community must flex their political muscle responsibly in election 2000.

Westly adds: "The people who have developed world-class technology have a responsibility to develop world-class standards to regulate this."

Radcliff is a freelance writer in northern California.



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A list of techno-political groups and their agendas.
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Executive giving

Tech multimillionaires (and billionaires) exercise power in their communities through generous donations. BY JOANN GRECO

Not long ago, United Way of Santa Clara — which services some 100 nonprofit member agencies in Silicon Valley — announced it was closing its doors. An $11 million deficit seemed insurmountable. And with costs rising every day, the charity decided it was useless to go on.

The decision stunned the affluent Valley community, so much so that a white knight in the form of 42-year-old Infoseek founder Steve Kirsch quickly appeared on the scene. His $1 million check was just the beginning of an extraordinary campaign that saw others rally this spring to make up the shortfall in a few weeks — with a couple extra million tossed in for good measure. It's a great story, and one that is becoming increasingly familiar.

"There's been a stereotype of the Valley as the land of $5 million homes and five-car garages, but the level of philanthropic giving is increasing dramatically. For example, 91% of those aged 35 to 44 here give to charity," says Peter deCourcy Hero, president of Community Foundation Silicon Valley (CFSV).

Some say an unseemly gap remains between what today's tech millionaires are worth and what they've given. According to a CFSV study, 43% of the area's rich ($100,000+ annual income) give less than $2,000 annually (the national average for that income level) to charity. In Washington state, the tech-rich Puget Sound region boasts 74,000 households with a net worth of more than $1 million, yet the state ranks low in giving.

Experts cite the folly of youth as a primary reason. The young cyber-rich, they say, may need to be taught about philanthropy because it isn't even a blip on the radar screen of the average 29-year-old.

Take Microsoft Chairman and CEO Bill Gates, the prototypical slow learner in this respect. Although Gates created a foundation in his name in 1994, only lately has he been steadily filling its coffers. Today, the newly consolidated Bill and Melinda Gates Foundation has assets of $17.1 billion, making it the world's largest foundation. Cynics might see the sudden generosity of Microsoft's head honcho as an attempt to polish a tarnished image. But others might believe that as the 44-year-old ambles into middle age, he's done buying toys, finished building a family, has the wonderful house, and is now ready to start thinking about old age and what his legacy will be.

Like Gates, the young and newly rich may require a different kind of courting. Many foundations and nonprofits are trying to tackle the problem. They're commissioning studies, conducting seminars, forming initiatives and pursuing new ways of reaching this elusive sector.

Some of the appeals are amusingly practical. Not giving is "crazy from a tax point of view, if nothing else," CFSV's deCourcy Hero says.

"Getting involved at an early age allows you to make a difference while you can actually see it," Infoseek's Kirsch points out. Kirsch is certainly a great role model (he and his wife maintain a $50 million fund at CFSV), as are a few other stellar persons, including Dell Computer Chairman and CEO Michael Dell and AOL Chairman and CEO Steve Case.

But the cyber-rich haven't really had many leaders to follow. Only three tech millionaires (er, make that billionaires) appear on a recent *Fortune* list of the 40 most-generous Americans: Microsoft co-founders Bill Gates and Paul Allen, and PeopleSoft Founder David Duffield. (In contrast, some 70 computer, Internet and network leaders are listed on the latest *Forbes* "400 Richest Americans" list.) Many tech companies do their best, however, to encourage philanthropy through workplace drives, their own well-endowed

ILLUSTRATION JOYCE HESSELBERTH

corporate foundations, and special events such as Cisco's recent Netaid concert and AOL's Fall launch of helping.org, a philanthropy portal.

And whether individual giving is at the level it should be, nonprofits in tech regions are enjoying unparalleled success. In Austin, Texas, for example, the number of people who have donated stock options (an imaginative new way to give that's tailor-made for this sector) to the local United Way rose from 12 in 1996 to 111 in 1998, representing an increase of $600,000. In the Valley, CFSV's assets have grown from $7 million in 1988 to $350 million in 1999, and in the past five years the group has doubled its number of funds to 475.

Washington state now has 300 more private foundations than it did 10 years ago, and the United Way of King County, which covers Seattle and its environs, reported an increase of almost $9 million in the past year alone. This United Way also reports more people at the $10,000-plus giving level than any other, despite the relatively small population from which it draws.

Rick Rafael, spokesperson for United Way of King County, credits a concentrated effort to better reach these potential donors. "A few years ago, we noted the disparity and started formulating a strategy specific to this market," he says. "We've learned that high-tech donors tend to be much more interested in the results generated by their contributions. We've also seen that they're much more hands-on — we see a lot more volunteerism coming out of the high-tech sector."

One of his generous donors agrees. "We're active," says Dave Chase, a 34-year-old Microsoft product unit manager. "Whereas previous generations may have passively written a check, our generation wants to more closely scrutinize where our money goes, since we realize some nonprofits are more effective and efficient than others. We'd also like to see that there be more leverage in the money we give."

Aside from their relative youth and a quite literal need for interactivity, the cyber-rich differ in another significant way: Much of their wealth remains in stocks. "That's where the real gap lies," CFSV's deCourcy Hero says. "A quarter of the people working in Silicon Valley are receiving stock as some form of compensation, and only 3% are giving stock. There's a vast, untapped pool of resources that's not finding its way into charity."

He cites eBay, an early options-giver, as a great example of what can happen. "It gave us 100,000 shares before going public, and today those are worth $40 million," deCourcy Hero says.

Such donations are part of a new kind of giving known as "venture philanthropy." Based on a model that every high-tech employee understands — venture capital — this system encourages "partners" to invest in innovative and needy charities. The idea is for them to nurture their financial investments with guidance, resources and quite active participation — just as real venture capitalists do.

The first such effort, and now a model itself, is the Seattle-area Social Venture Partners (SVP), founded in 1997 by former Aldus President Paul Brainerd. To date, nearly 200 partners have signed on, each donating $5,000 and bringing foundation assets to $1 million.

"The required donation certainly represents a fairly nominal sum of money to the people we're trying to attract, but the point is not so much the money: It's about establishing a connection between the donors and the recipient organizations. "That's the real leverage — when these highly intelligent, talented people become truly involved with making a nonprofit organization more successful," says Scott Oki, an SVP co-founder and former Microsoft executive who has joined 20 nonprofit boards since his retirement eight years ago at the age of 43.

Helping children in need is one of the most popular causes for SVP and other donors in the high-tech sector. For example, Microsoft's Chase has committed to giving the United Way of King County $250,000 over five years, with a request that the money be distributed to kids' organizations. "My wife and I are also very interested in environmental causes that help ensure that kids will have the same kinds of beauty we enjoyed growing up," he says.

Chase says, "We hope we can be an example to our peers so they accelerate their giving, too."

Others prefer lesser-known, more-focused causes. Randy Baker, a 55-year-old executive vice president at Oracle, is dedicated to Alliance for Community Care, a San Jose organization that serves the severely mentally ill. "I give money and consult on the agency's business issues, but perhaps the most important contribution I've made has been informally talking about mental illness and its effect on society as a whole," he says.

Baker provides but one example of the giving style of this group: individualistic, focused and dedicated. It's just one more product of those who have created a new industry and risen to its pinnacle. ■

A CLOSER LOOK: The personal giving of some of the most powerful and generous people in the networking world.

KATHLEEN KING

Paul Allen
Microsoft co-founder

Worth $40 billion

Allen's individual gifts have included $10 million to Washington's Lakeside School and $4 million to a public sculpture garden to be developed in Seattle. He's established six foundations, focusing on causes related to the environment, education, the arts, medical research and community service, with current total assets of $6 billion. The foundations fund charitable groups and projects serving the Pacific Northwest.

Steve Case
AOL co-founder, chairman and CEO

Worth $1.5 billion

Case created an eponymous foundation ($100 million in assets) with his wife in 1998. It focuses on delivering health care and educational opportunities (including, as is expectedly popular with tech givers, science and computer education efforts) to underserved children in Fairfax County, Va. He advocates using online technology to benefit society, improve the lives of families and children, and empower the disadvantaged.

Vinton Cerf
Internet pioneer and MCI WorldCom senior vice president for Internet architecture

Net worth not public

Cerf helped found the Northern Virginia Resource Center for Deaf and Hard of Hearing Persons, serves on the board of Washington, D.C.'s Gallaudet University, chartered by Abraham Lincoln for deaf and hard of hearing students, and works as an advocate for bringing technology, including e-mail, Internet chats and telecommunications devices, to that population.

Jim Clark
Founder/co-founder of Silicon Graphics, Netscape and Healtheon

Worth $1.8 billion

Repeatedly crediting education as the key to his success, Clark has made it a focus of his giving. He made headlines recently by donating $150 million to Stanford University, one of the largest donations ever in higher education. He also donated $1 million to the Clark Foundation in Salt Lake City, which was founded by his son Michael to enhance informal science education through museums, aquariums and planetariums.

Michael Dell
Dell Computer founder and CEO

Worth $20 billion

Active givers, Dell and his wife have donated $500,000 to the Austin Public Library and established a $1 million United Way matching grant; have boosted a capital campaign for the Austin Children's Museum by donating $1 million; and have contributed $1 million toward a new imaging center at the Children's Hospital of Austin. Dell, along with five other Dell executives, recently pledged $13 million to help the Austin Museum of Art expand.

Larry Ellison
Oracle co-founder and CEO

Worth $13 billion

Last year, Ellison donated $5 million to the University of California/Davis Health System, its largest ever private bequest, to fund a new ambulatory care center. According to an Oracle spokesperson, Ellison's personal interests drive the company's corporate giving, which is skewed to medical research; the protection of endangered animals and the environment; and math, science and technology education for K-12 students.

Bill Gates
Microsoft co-founder and CEO

Worth $85 billion

After increasing the funds in his personal foundation to a whopping $17 billion, Gates will now be donating an estimated $850 million per year in order to meet the 5% disbursement required to keep the foundation's assets tax-exempt. His pet causes include inoculation and other health services for the world's poor, Internet access for schools, and education (including, as with co-founder Allen, a $10 million contribution to the local private school they attended, Lakeside).

Steve Kirsch
Infoseek founder and CEO

Worth $200 million

Kirsch and his wife maintain a $50 million fund at the Community Foundation of Silicon Valley, and commit $5 million each year to other, mostly medical, causes. The Kirsches also have granted $100,000 to the Silicon Valley Arts Fund, $500,000 to the Tech Museum of Innovation, and $200,000 to Santa Clara Libraries, as well as $1 million to rescue the local United Way.

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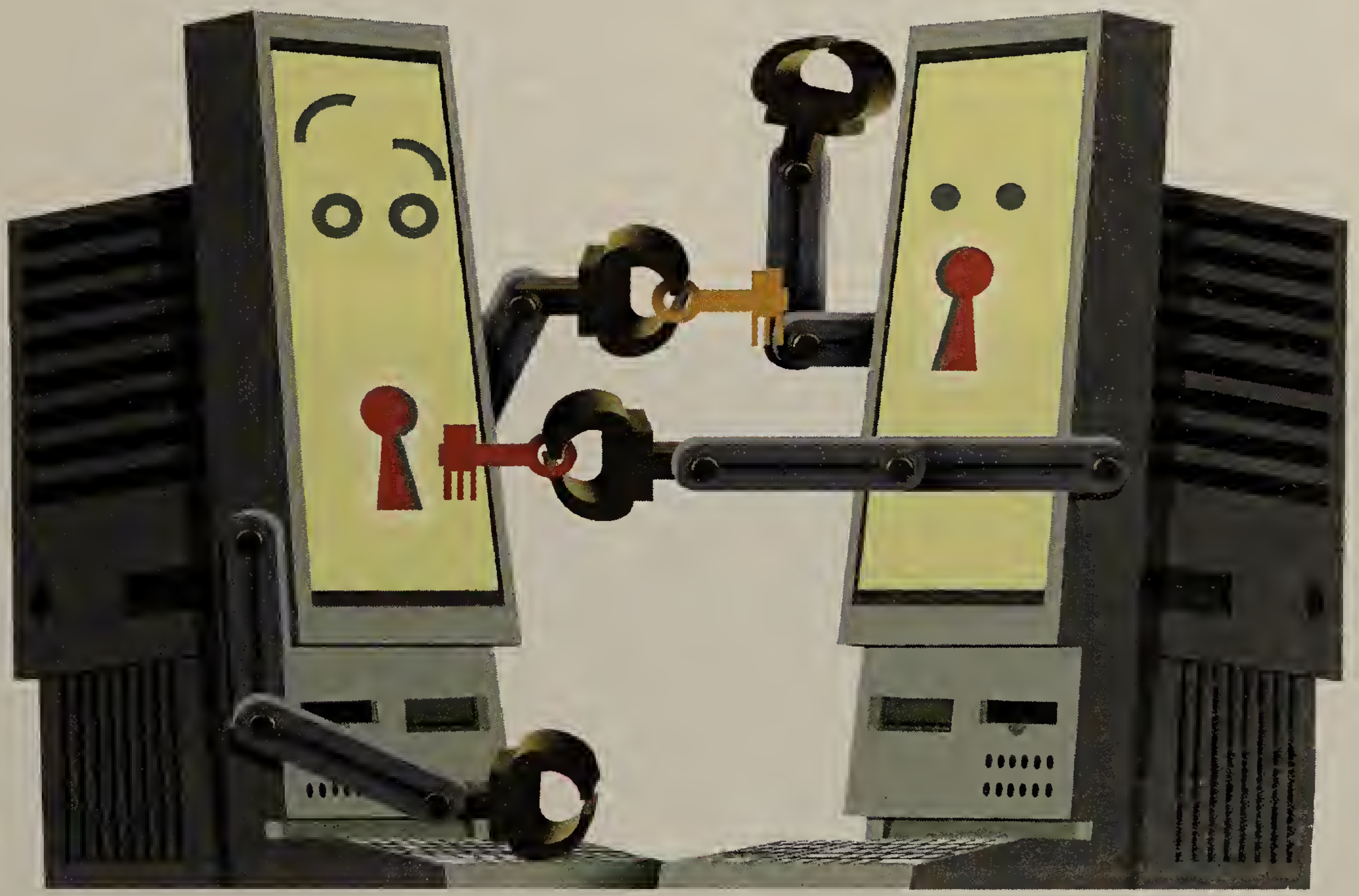
5 power struggles

shaping the network industry

The network business is fraught with strife. Vendors battle each other for market share, and fight internal fires that threaten to hinder product development, throw strategic directions off course or send revenue spiraling downward. Standards-setters grapple with the best paths to take with specifications, and incumbent carriers lobby hard to squelch advances by their foes. And you've got to keep track of all this, on top of containing technology and management problems within your own department and throughout the company.

That's where we come into play, with our annual examination of key power struggles shaping the network industry. This year, we look at what's happening with:

- *Development and implementation of IP Security.*
- *Corporate policies on e-mail and Web usage.*
- *Advancement of the storage-area network market.*
- *Creation of business-to-business electronic commerce standards.*
- *Carrier deregulation efforts.*



IPSec punchfest

From multiple drafts to sparring test labs, power struggles dog this standard. BY JULIE BORT

You need look no further than the IP Security (IPSec) effort if you want to see a perfect example of a power struggle in the network industry. Power swirls around this Internet Engineering Task Force protocol like a twister surrounding Dorothy.

Contributing to the maelstrom are arch rivals that intermittently work together over IPSec interoperability and duke it out over how to write the next portion of the specification; at least four independent — and often opposing — testing organizations; and a handful of spokespeople for users, who remain sorely under-represented.

While the core of the IPSec specification, including machine-to-machine tunneling and encryption methods, is now an official standard, bickering continues over how to improve the standard. Likewise, vendors and testing organizations are engaged in power battles over how to validate implementations of the agreed-upon IPSec standard. And the already slow democratic process of the IETF grinds to a crawl

ILLUSTRATION: VAL MIKA

"The IPSec Working Group has been working for about seven years. Usually the IETF likes a working group to finish in 12 to 18 months," says Ron Cully, lead product manager for Windows Networking for Microsoft.

To be fair, the working group has valid reasons for a lengthy tenure. A security standard for IP — originally intended to be part of IPv6 — is a complex matter. And the target keeps moving.

"It's taken them so long largely because the technology changed out from under them," explains Andrew Newman, senior systems analyst for Yale University IT Services, an IPSec user and co-author of *Implementing IPSec*. "The early IPSec standard . . . was developed for a time when there wasn't a broad need for security."

Not so today. The average enterprise uses IP to create LANs, provide remote access, connect far-flung offices and conduct electronic business. In addition, the enterprise has sewn itself up with remote access servers (RAS), public-key infrastructures and network address translators. Smoothing a standardized IP-based security blanket over the top is no easy task.

Still, the same argument could be applied to any widespread standard conceived to ensure multivendor interoperability. Yet Secure Sockets Layer has managed to grow from seed to flowering plant in roughly the same time frame. And XML shows that the industry can cooperate in fast-forward mode when it wants to.

So what's the holdup on widespread IPSec interoperability? Why, after years of bake-offs and Interops, does interoperability remain iffy at best?

The answer has three parts: Philosophical disagreements in the working group tend to come from companies that have a vested interest in a particular technology; testing organizations work for the vendors; and users don't have much input.

THE PHILOSOPHY OF SECURITY

Vendor marketing makes it sound as if the industry is a lot closer to IPSec interoperability than it actually is. It's true that interoperability exists today, but only if you need to tunnel between gateways with permanent IP addresses and you can exchange keys offline. If vendors claim interoperability — or display a stamp from the International Computer Security Association (ICSA) — this is typically the IPSec compliance they're espousing.

"The basic stuff is done and has been done for some time," says Bob Moskowitz, IPSec Working Group co-chair and senior technical director in charge of the ICSA's IPSec testing lab. "But there are a number of problems we face from here, such as Internet Key Exchange (IKE) with a preshared key — it needs a static IP address. That eliminates dial-up."

IKE is IPSec's handshake and determines which cryptographic algorithm will be used for the session. Obviously, static addresses and preshared keys won't cut it for all users — particularly dial-up users with their dynamic IP addresses and extranet partners with whom a preshared key may not be practical.

"Interoperability for virtual private networks (VPN) has been an issue with us. Within our own company we find that as soon as you start running multivendor products, you're in trouble," says Ken Ng, systems architect for American Protective Services, a 15,000-employee, 100-office physical security firm based in Oakland, Calif. "We want the VPN to reduce the cost of our dial-up RAS."

And so the battle lines have been continuously drawn over how to modify the IPSec standard for remote access. For example, an IETF Working Group called IP Secure Remote Access has been formed to solve these issues — and this is reportedly the third time that vendors have tried to create an IPSec remote access working group.

There are three camps in the dispute. One wants to use Layer 2 Tunneling Protocol (L2TP) with IPSec; another wants to modify IKE so it can support legacy remote access authentication over the Internet (within this group are several alternatives); and a third group wants IKE modified to support Dynamic Host Configuration Protocol (DHCP).

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You need only look at a vendor's background to see which stance it is taking. Microsoft, which helped develop L2TP with Cisco, is leading the push for the L2TP/IPSec method. (L2TP is a derivative of Microsoft's Point-to-Point Tunneling Protocol and Cisco's Layer 2 Forwarding.)

TimeStep, which has always positioned itself as an IP-based VPN provider, has developed an Internet draft, dubbed IKE-XAUTH, that spells out the IKE/Remote Authentication Dial-In User Service (RADIUS) method. XAUTH stands for extended authorization. In fact, TimeStep has already released a product based on IKE-XAUTH, Permit Enterprise Version 2.0.

Other extensions to IKE include Hybrid Mode from CheckPoint Software (which uses XAUTH) and Crack from Network Alchemy.

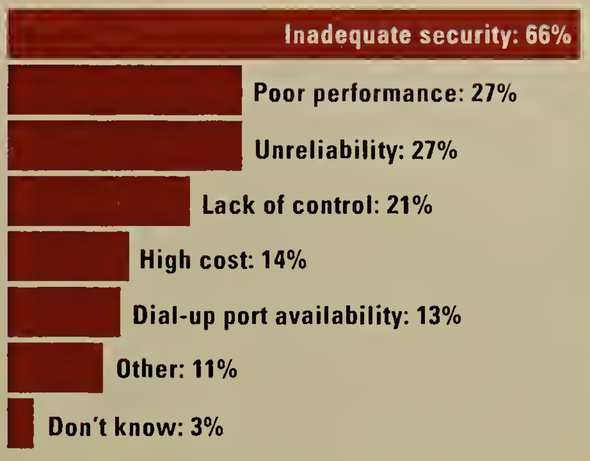
RedCreek Communications is leading the DHCP push. Engineers at RedCreek say their method — which spans two drafts — configures and authenticates remote access users' systems using existing protocols and requiring no IKE modifications. RedCreek was one of the first vendors to support IKE in its earlier form, ISAKMP.

To complicate matters, some of the L2TP crowd has joined RedCreek. Intel, Microsoft and Sun contributed to the first DHCP draft, and Microsoft also contributed to the second draft. But clearly Microsoft is putting its might behind the L2TP pitch. For Microsoft, it's not much of a risk. The L2TP draft uses DHCP anyway, says William Dixon, program manager for IP Security at Microsoft and an active participant in the IETF working group.

DUKING IT OUT

Which of the following represents your greatest concern in implementing an Internet-based virtual private network?

(Multiple answers allowed.)



SOURCE: CAHNERS IN-STAT GROUP, NEWTON, MA

The advantage of L2TP over IPSec is that it marries the exceptional encapsulating ability of L2TP with the superior security of IPSec, supporters argue. Both are well-established protocols that have been proven to work together. And this method places the burden of complexity on vendors, proponents say.

Opponents disagree, claiming that L2TP over IPSec burdens users because two protocols are inherently harder to support than one. Also, they say this draft is inefficient because it doesn't authenticate the user before establishing the connection. If the user isn't authorized for the services granted, it shuts down the connection.

A third common complaint is that L2TP over IPSec increases system overhead, a notion that Microsoft's Dixon downplays: "L2TP has the ability to use header compression. With that, the header content gets down to a single byte of overhead."

Backing the viability of L2TP with IPSec are some analysts — independent of the IETF working group — who note that L2TP is used to encapsulate other types of packets in IP and is already common in enterprise nets.

"Most enterprises don't have just IP. They have IPX and SNA. L2TP isn't aimed at [Open Systems Interconnection] Layer 2 tunnels, [as is IPSec]. There's no reason why you wouldn't use both in a network," says Eric Zines, senior market analyst for TeleChoice and presenter for *Network World's* VPN technical seminars.

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Those in favor of modifying IKE for stronger authorization point to elegance — especially for users who aren't supporting L2TP already. "They argue if you're going to do IKE [for authorization], add the code and do it right," IPSec Working Group's Moskowitz says. By improving IKE, IPSec can support legacy security systems such as RADIUS.

But others are against the idea, calling that approach "imprudent" in their drafts. The catch, they point out, is network address translation (NAT).

NAT is a work-around for the address shortage in IPv4. It lets companies use their own, unregistered IP addresses for devices when communicating internally and to share fewer registered addresses when sending packets externally. NAT devices are good for making do with fewer registered addresses, and they add security. If hackers can't find the IP address, they can't access the device from the outside.

But "IKE is NAT-hostile," Moskowitz says. "It places the IP address inside an encrypted packet."

At best, this means that the internal address must become public — negating NAT's security benefits. At worst, it places that IP address inside an encrypted packet, leading to routing problems.

Certificates, too, remain a sticky issue for user authentication. While one request for comment describes how to exchange certificates, it does not specify how those certificates are verified, Microsoft's Dixon says. So, of course, vendors are filling in the blanks themselves. "Interoperability tends to get derailed by other vendors. You have to implement pieces that are essentially vendor extensions," Yale's Newman says.

NO OBJECTIVITY

Which technical choice should users push for? That's hard to say because there are no objective sources of information, other than the trade press. Vendors are basing their drafts on technologies that give them the fastest time to market, not necessarily the best standard.

"RedCreek and TimeStep are two relatively small companies very active in standards work and shipping products," Dixon says. Of course, Microsoft, too, has implemented IPSec over L2TP in Windows 2000.

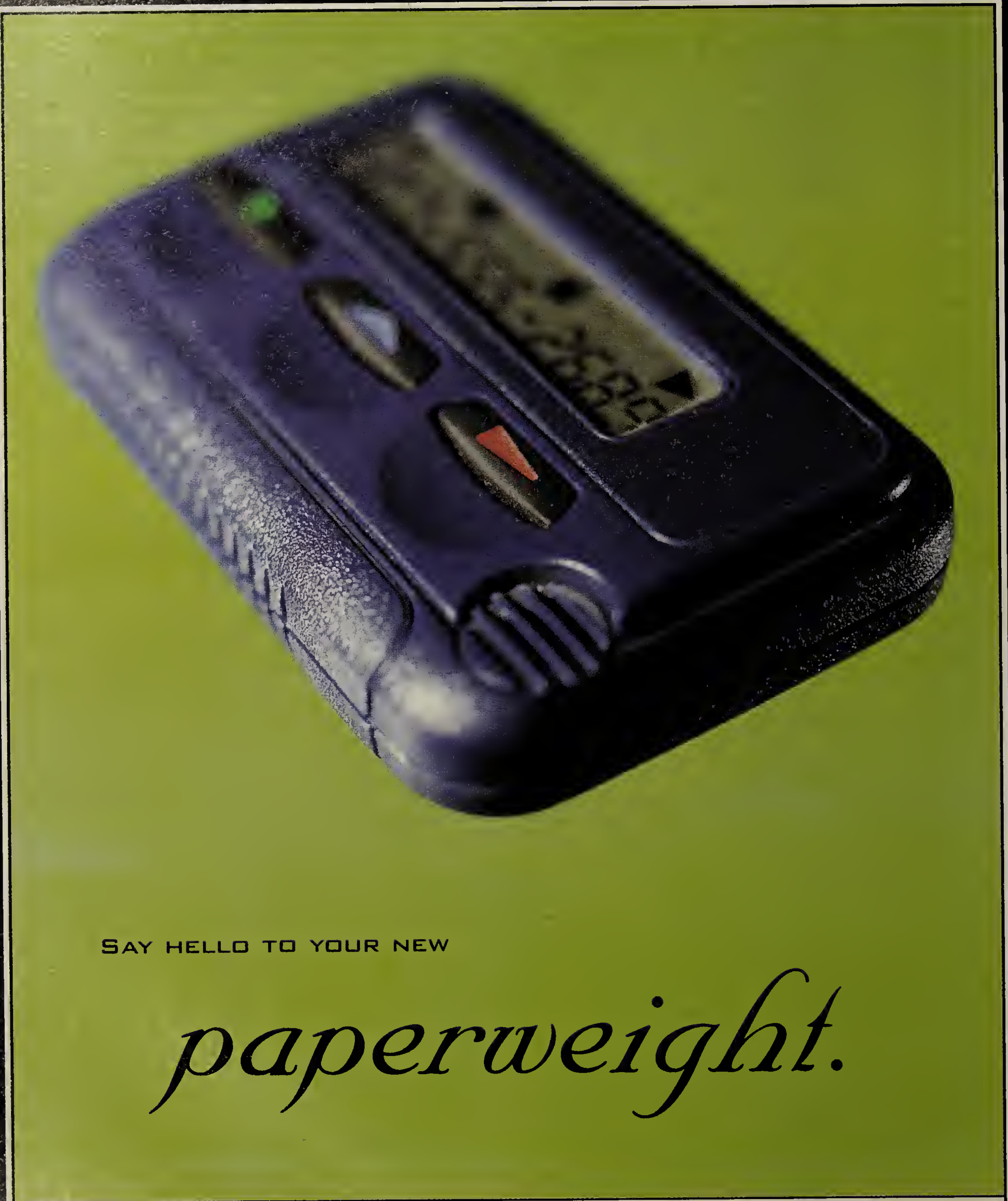
The best source of information would be other users, but they aren't involved enough. "Although the IETF is pretty open, users don't get much of a voice. The people spending most of the their time in working groups are the vendors, Dixon says."

Adds Moskowitz, "these issues are so heavily laden with technology that most users won't be able to enter the debate effectively unless they go the route I've gone and really get into the middle."

Even Moskowitz, users' former top representative, now represents a vendor of sorts. Although Moskowitz is still the working group's chair, he was working for Chrysler when he began with IPSec. Currently he runs the IPSec interoperability test lab at the for-profit ICSA. While it's certainly good to have a former user as testing watchdog, the ICSA makes big bucks from the chronic lack of interoperability, reportedly charging as much as $25,000 per box for testing.

Consequently, some working group insiders have accused Moskowitz of having a conflict of interest. As long as interoperability problems remain high, business will boom at the ICSA, they say.

Continued on page 80



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Continued from page 78

Moreover, the ICSA tests only shipping products for IPSec conformance — and only a subset of the RFCs at that — along with testing other aspects of security And although the ICSA doesn't publish this statistic, boxes routinely fail. This has frustrated many vendors that want the ICSA to help them achieve compliance for the current standard and emerging versions.

Vendors are so angry that they've established a second forum, the Virtual Private Network Consortium (VPNC). Paul Hoffman, known for his work with the Internet Mail Consortium, runs this group.

"All of my members are extremely unhappy with the ICSA. The ICSA is absolutely failing them," Hoffman says. However, he adds that if the ICSA would agree to assist with interoperability development more, "there would be no reason for the VPNC to exist."

Moskowitz says this is a case of the good guy vs. the bad guy. "Paul plays the role of getting things going, and the ICSA is the bad guy at this point. We hand the box back to the vendor and say 'fix your product.' We don't want the ICSA to be the good guy, or we can't be an effective bad guy. We want two organizations."

Still, Hoffman recognizes that the market is so wrought with power struggles that vendors have created their own interoperability bottleneck.

"It's not the standards process that's going so slowly. It's the vendors," he says. "Vendors won't get on the phone with one another. . . . A lot of them do want to cooperate, but only to get interoperability on whatever feature is hot today."

For that kind of short-term cooperation, vendors can turn to the IPSec Developers Forum. Formed by Radguard, the forum introduces vendors to one another for one-on-one tests, says Avi Rembaum, director of marketing for Radguard in Tel Aviv, Israel, and the forum's manager. Developers can use the forum for free.

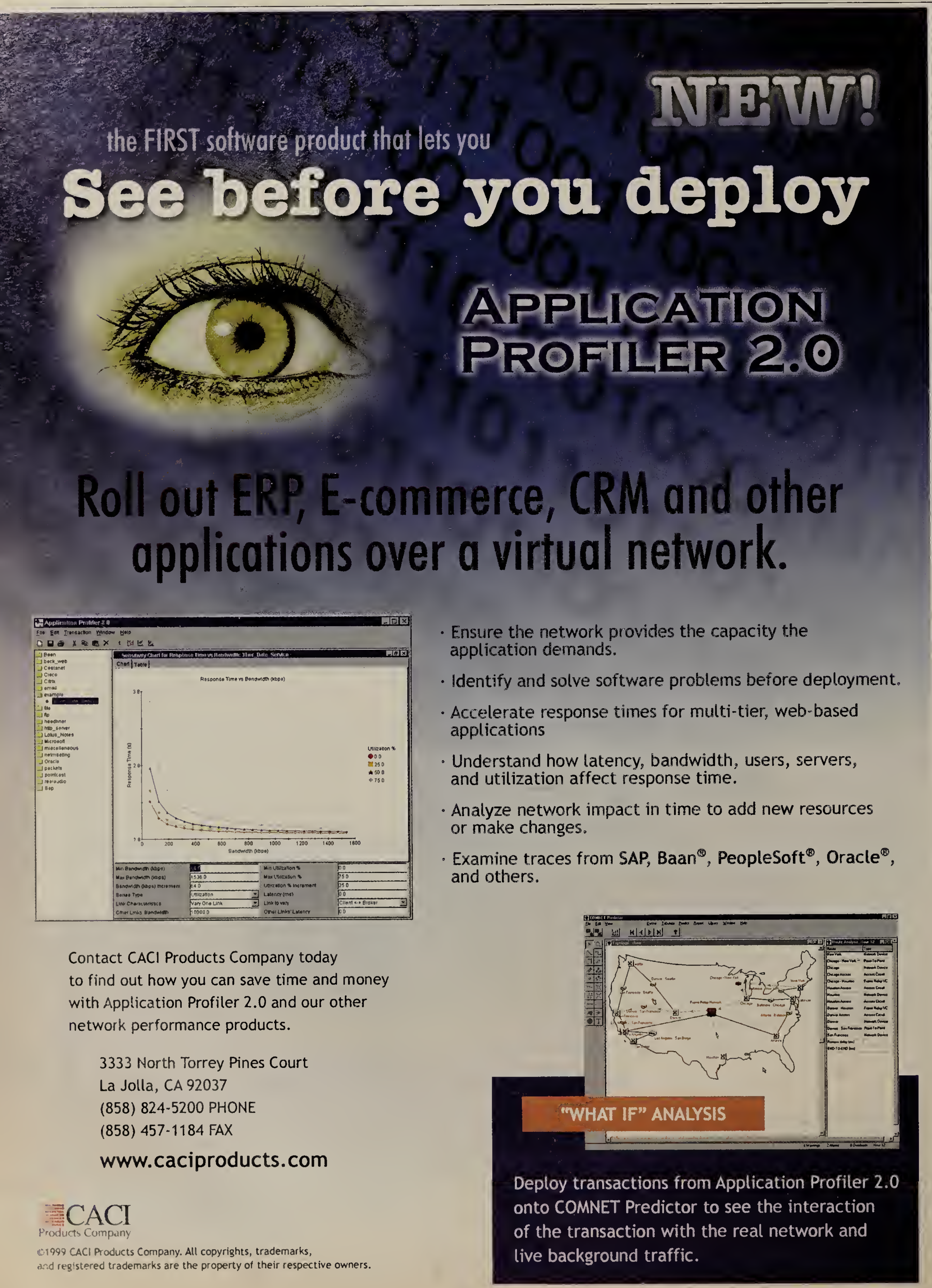
Likewise, the National Institute for Standards and Testing (NIST) has a test site on the Web that allows vendors to test their IPSec products against a reference IPSec implementation over a live Internet connection. For example, it allows vendors to test "a single IKE negotiation," says Sheila Frankel, a computer scientist for NIST's Computer Security Division in Gaithersburg, Md.

Yet for all this testing, none of the results are available to users. The rationale is that if the public knew about failed tests, vendors wouldn't want to work on interoperability.

However, one exception exists. ICSA publishes lab notes for products that receive the ICSA stamp. These document exactly how interoperability was achieved. Long notes embarrass the vendor into improving its IPSec implementation, Moskowitz says.

Still, the VPNC, the IPSec Developers Forum and NIST sites are helpful user sources because they offer other ways to glean information about IPSec interoperability. The VPNC is readying a chart that documents which vendors have tested successfully with each other, and the Forum and NIST are available to users for IPSec interoperability tests. Plus, NIST lets you download its IPSec reference specification — which is valuable for network engineers who need to learn about IPSec.

At this point, the process sorely needs more user input. Your future remote-access network is being decided now, and for the most part, without you. ■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The perils of privacy

Net managers who don't forge — and enforce — stringent business-only e-mail and Web usage policies put their companies at risk. BY SHARON GAUDIN

A marketing manager forwards an e-mail joke containing a racial slur to a group of co-workers. But before the message can reach anyone, monitoring software scoops it up and ships it to the manager's supervisor, garnering the sender a reprimand and potentially saving the company from a costly and embarrassing lawsuit.

Down the hall in the billing department, a clerk uses her lunch break to scan the Web for information on abuse victims. The information she calls up also flashes onto a screen in her boss's office, and now he knows a secret she never told anyone.

Think your boss isn't reading your e-mail, counting the seconds you're away from your computer, patrolling the sites you're visiting on the Web, or even counting the number of keystrokes you make per day? Maybe not today, but he might be tomorrow. Personal use issues are coming to a head as companies struggle to find effective ways of balancing employee freedoms and corporate protection.

Industry watchers say the government, through the arm of the courts, is delivering a stern warning to American businesses: A company is liable for most wrongs that its employees commit using computers, e-mail or browsers on the job. If a company wants to ward off that kind of liability, it had better set up a business-only policy, and make sure its employees understand it and adhere to it.

"An employee should have no expectation of privacy rights in the workplace," says Kerry Stackpole, president and CEO of the Electronic Messaging Association (EMA), a nonprofit group in Arlington, Va., that represents business-oriented e-mail users. "That's not what the workplace is all about. Employers own the system and the PCs or the laptops. They are liable for what the employee does on them, for harassing messages they might send. There's very little that protects employees from the eyes of employers."

ILLUSTRATION: VAL MINA

Workers generally spend their days working. But in the span of an eight- to 12-hour workday, they might get an e-mail from a college buddy across the country or a sweetheart down the block. They might scan the Web for a quick read of their horoscope or the score of last night's hockey game. It's the lure of instant information at our fingertips.

"I think it's very hard in the modern world to segregate people's personal lives outside of the workday, particularly when workdays have gotten to be so long," says Joe Grabarz, executive director of the Connecticut Civil Liberties Union in Hartford. "People have life crises during the day. The human condition prevents us from so neatly excluding our private lives from 8:00 in the morning to 8:00 at night. People simply function as full human beings."

And a good percentage of companies have been running on the honor system.

"We basically treat people as adults and expect them to act like adults, and so far, so good," says Bob Frase, director of IS at PACE International Union, a union of 320,000 paper and oil workers located in Nashville. "We have enough work around here without messing with that stuff. There are some jokes that float around, but we figure it's good for morale. I could have somebody chatting with his mother all day, but we do a lot of walking around, and I don't think that would go unnoticed for very long. If people feel they're trusted, then attitude, morale and performance are better."

But some companies have only been trying to make work a place for online business since employees were first given e-mail and browsing software. Chatting online or cyber shopping wastes time that could be spent answering a customer's question or balancing the bottom line. And all that e-mail from Mom sucks up a lot of bandwidth. Last year's animated holiday e-card craze shut down corporate systems all over the country.

Those problems generally earned warnings to cut down on personal use or not open holiday greetings. But the majority of companies didn't put a stop to everything personal. Most companies didn't set up monitoring software that scoops up any e-mail containing the words "sex," "Saturday," "vacation" or "date." They didn't start thumbing through cache histories to see where adventuresome cyber-explorers had been surfing.

But a fear of costly lawsuits and big punitive awards might be changing those hands-off decisions. A growing number of companies are putting an end to mixing business with pleasure when it comes to online communications.

"Every company is going to be sued sometime," says Jim Bruce, a cyber-lawyer and partner at Wiley, Rein and Fielding, a Washington, D.C., law firm. "The courts are telling companies that they can make it hard on themselves or they can make it easy on themselves. If they're smart, they'll have rules of the road and make sure employees know what those rules are. The courts made it pretty plain this summer where they stand on this."

Bruce explains that two recent court cases — Kolstad vs. The American Dental Association and EEOC vs. Wal-Mart Stores — set precedents. Each case found that companies are liable for their employees' actions on the job because the company was managing them at the time.

While those two findings didn't necessarily talk about e-mail or Web surfing, corporate lawyers know that both computer functions can be hotbeds of trouble, Bruce says. "People don't realize what's out there — pornography

Continued on page 84

NO SECRETS IN CONNECTICUT

Companies have the right to monitor their employees' online actions, and in every state but one they also have the right to do so without informing their workers.

The state of Connecticut last year passed legislation mandating that employers inform employees of when and how they will be monitored. California tried to follow suit this year, but Gov. Gray Davis vetoed the bill.

"We were very concerned, given the increase in calls we were getting from people who thought the law was being violated by their boss rummaging through their e-mail," says Joe Grabarz, executive director of the Connecticut Civil Liberties Union in Hartford. "Most employees thought that since their boss didn't open their mail, he wouldn't open their e-mail. This doesn't ban that, but it makes employees aware that it's happening."

Despite this "paltry" law, Grabarz says Connecticut is far ahead of any other state. "We forget the measure of someone's job performance is productivity. The bigger picture is creating a workplace where employees are happy doing what they do, and that means carving out some privacy."

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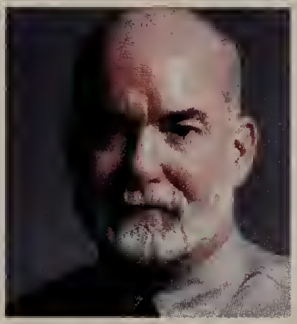

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Continued from page 82

and racist jokes, all sent among friends," he adds. "Once it's come through, it's sitting on their systems. Where you get into trouble is when there's an allegation of race or sex discrimination. Suddenly there's a subpoena for what's on peoples' computers."

And how better to keep employees from sending harassing e-mails, using company computers to hack into another site or even creating a hostile work environment by calling up pornographic Web sites at their desks? Don't let them do anything that's not directly work-related.

"It's a matter of wasting bandwidth, wasting time and of liability," says Allen Butler, director of standards and architecture for Downers Grove, Ill.-based RR Donnelly & Sons, which has about 16,500 e-mail users. "This is a business system for business use only, and we do monitor. We have to protect our assets, and I don't think that's unreasonable."

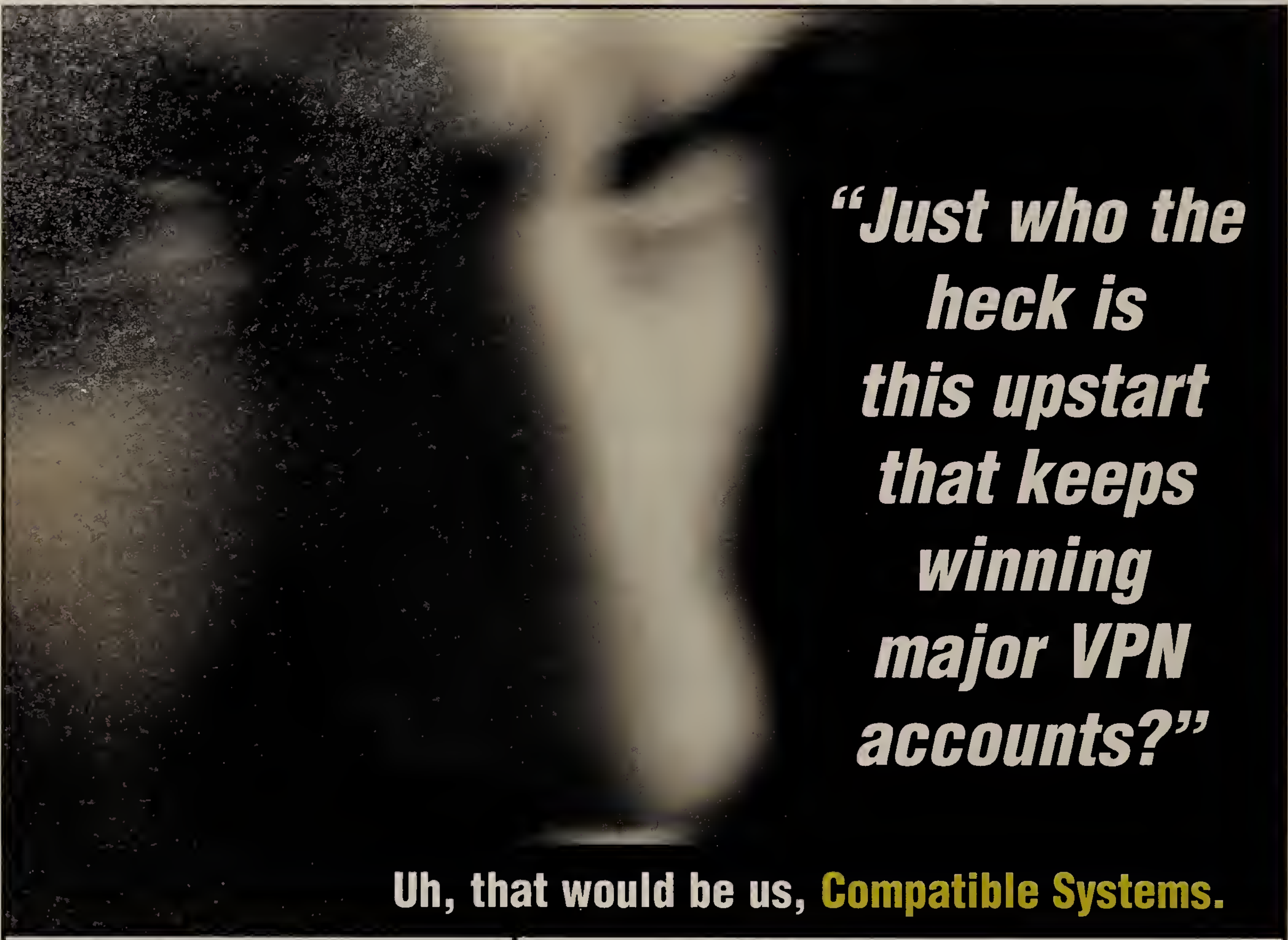
Butler, who also is working to develop a policy for Web browsing, says people respond better when they know where they stand and what's expected of them. And industry watchers say that's not only important for the workers, but it's also an important liability point for business.

The courts say if a company wants to avoid punitive damages, it must set up policies to keep employees within the law — whether it be for harassment or sexual discrimination — and it needs to make sure employees understand the letter of the law, Bruce says.

"It's clear that the courts are holding companies up to a standard by which it's no longer sufficient to tell employees that there is a policy. You have to be able to demonstrate that employees understand what you told them," the EMA's Stackpole says.

Toward that end, the EMA is working on customizable software that companies could use to test employees' understanding of computer-usage policies, Stackpole says. The software, meant for running on intranets, not only should also be able to quiz workers on policy but also have them make decisions about various scenarios. If the employee chooses the wrong answer, a tutorial pops up on that aspect of the policy and then another scenario is given to test the worker again.

"Companies can use that as a defense when they go to court," Stackpole says, adding that the software should be available early in 2000. "Charlie could say, 'I read the policy but I didn't understand it.' We can now say, 'You scored 99 on the test. How is it possible you didn't understand?'" ■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WHO'LL HAVE THE POWER?

Read more: Columnists Mark Gibbs and Paul McNamara go head to head on the privacy issue. See our Signature Sign-off column, page 99.

SAN trap

SAN vendors struggle to stem the tide of modest, trial implementations and land the big-ticket sales.

BY DENI CONNOR

The world's insatiable appetite for information has helped ensure a bright future for storage-area networks (SAN) and the underlying Fibre Channel technology. But for the abundance of vendors that want a piece of the action today, it's an uphill battle to convince users to buy into a new, unfamiliar technology.

For one thing, many would-be SAN users aren't entirely convinced they need a parallel storage network. Nor are they thrilled about abandoning the investments they've already made in direct-attached storage drives and backup devices. In addition, a lack of standards makes users wary about committing to vendors.

Still, these obstacles haven't stopped many vendors from racing to carve a niche for themselves somewhere in the enterprise-level SAN architecture. Among those stricken with SAN fever are Fibre Channel hub, switch and controller vendors, such as Ancor, Brocade Communications, Crossroads Systems, Emulex, Gadzoox and Vixel; storage vendors EMC, Hitachi, Storage Networks and StorageTek; system vendors Compaq, Dell, Hewlett-Packard and IBM; backup vendors Legato and Veritas; and SAN start-ups Connex and SANCastle.

One company that did abandon the market is 3Com, which scrapped plans to produce Fibre Channel switches, hubs and host bus adapters less than six months after announcing its line.

3Com's withdrawal is symptomatic of the gap vendors need to bridge between two divergent technologies — the traditional storage interface SCSI, which is familiar to users and consistent with their idea of a converged network scenario; and newfangled Fibre Channel, which reinvents the network. Right now, it's anyone's game.

MIXED MESSAGES

Vendors that have stuck with their SAN strategies spent the past year posturing — partnering among themselves, forming OEM sales relationships, introducing new SAN bundles and creating more architectures. In short, vendors have been laying the groundwork to deliver full-blown storage solutions to countless customers facing burgeoning amounts of data.

But now that the time has come to rein in customers, the odds are not in vendors' favor. "There are more SAN vendors than there are users," says one analyst who asked not be identified.

In addition, SAN users to date are less free-spending than vendors had hoped. It seems many who are implementing SANs are doing so cautiously, putting in small projects to prove the concept before moving on to more grandiose schemes.

ILLUSTRATION: VAL MINA

One example is Bruce Covey of Home Depot in Smyrna, Ga. Covey built a modest SAN that connects several Macintosh workstations to Avid video-editing storage via a Fibre Channel hub, but this SAN is separate from Home Depot's corporatewide SAN.

Yet another issue is that users are implementing mostly homogenous solutions — for example, linking a bunch of Windows NT servers to a single disk subsystem and installing a second SAN to take care of Unix or mainframe servers. Chief Technical Fool Dwight Gibbs of The Motley Fool did just that. He has a Compaq StorageWorks SAN for database access and a Network Appliance file server for network services. He wants his database traffic to be as fast as possible and unaffected by the network traffic. "When you start mixing and matching vendors for something new like Fibre Channel, you have a lot of finger-pointing," Gibbs says. "When there's a problem, I know exactly who to talk to."

Such installations aren't what SAN vendors envision. They insist one of the greatest strengths of a SAN is its heterogeneous capabilities. Vendors want to see users tie SANs to their networks, connecting all their servers with routers or switches to all their disk and tape storage — courtesy of a single vendor that offers a complete line of Fibre Channel products from companies with which it's partnered.

That's the reason vendors trudged along last year building end-to-end SAN packages they expected would be attractive to users. Now trained systems integrators and consultants are available, and vendors have done all the OEMing they can. Their SAN bundles work, vendors say, and it's time for adoption.

But users are hearing different advice from people such as Bruce Congdon, vice president of strategic innovation and architecture for New York's National Association of Securities Dealers, the parent company of the NASDAQ stock exchange. Congdon recommends buying a SAN from a single vendor and trying a "low-impact, non-mission-critical application" for your first SAN investment. Once you've acquired knowledge from the vendor, go out and buy other routers or switches based on the knowledge you've obtained, he says.

This advice plays into users' reluctance to give up proven methods for something new and unfamiliar. To win users, SAN vendors must get them to view networking in a completely new way and convince them that storage data must be separated from network data by a parallel data infrastructure.

Supporting the vendors' position are analysts such as Michael Peterson of Strategic Research in Santa Barbara, Calif. He agrees that separating storage traffic from network traffic is essential. After all, storage traffic amounts to 25% of all network traffic, Peterson says.

It's not an easy sell, but users are starting to slowly understand the need for SANs, says Dave Hill, storage research director at Aberdeen Group in Boston. But he warns that SANs will be as slow to catch on as networks were in the '80s.

One reason is that there's just too much new technology to assimilate. "SANs are at the stage that LANs were at 10 years ago," says Peter Tarrant, vice president of marketing and business development at switch specialist Brocade. "A lot of uncertainty exists."

To deal with user trepidation, Brocade is altering its strategy, which previously centered on high-end, multiport Fibre Channel fabric switches. In November, the company introduced small, eight-port switches to compete with managed hubs made by Gadzoox and Vixel. There is a huge market to be tapped in small installations, Tarrant says.

Until users become confident, vendors need to provide the SAN products that they're willing to invest in now.

STALLED STANDARDS, MGMT. TOOLS

Another obstacle to SAN implementation is interoperability. At this point, it's unclear whether any SAN products interoperate. Throw them all into a lab, and you'll find that one switch won't work with another. Or one host bus adapter may work with routers from vendors A, B and C, but won't work with products from vendors D, E and F.

While vendors claim to be working on interoperability, their efforts are divided and self-serving. EMC is starting its own interoperability lab to see if everyone else's equipment works with its products. But to be effective, interoperability testing needs to be performed by a single body, observers say, not groups of vendors each testing its own solutions. So far only Ancor, Brocade, Gadzoox, McData and Vixel are working together to make sure their switches interoperate in the same SAN.

A logical venue for consistent interoperability testing might be any of the quasi-standards bodies. The Storage Network Industry Association, in fact, has started interoperability working groups to establish some measures of conformance. But Bob LiVolsi, senior vice president of sales and marketing at Crossroads, says: "Standards are going to be set by the market and not by a trade association."

Until that happens, you would be wise not to add switches or other devices until you can prove interoperability with other SAN equipment. Ask for a money-back guarantee. The Motley Fool's Gibbs is one savvy user who asked for a money-back guarantee from Compaq and got it.

Manageability issues are also

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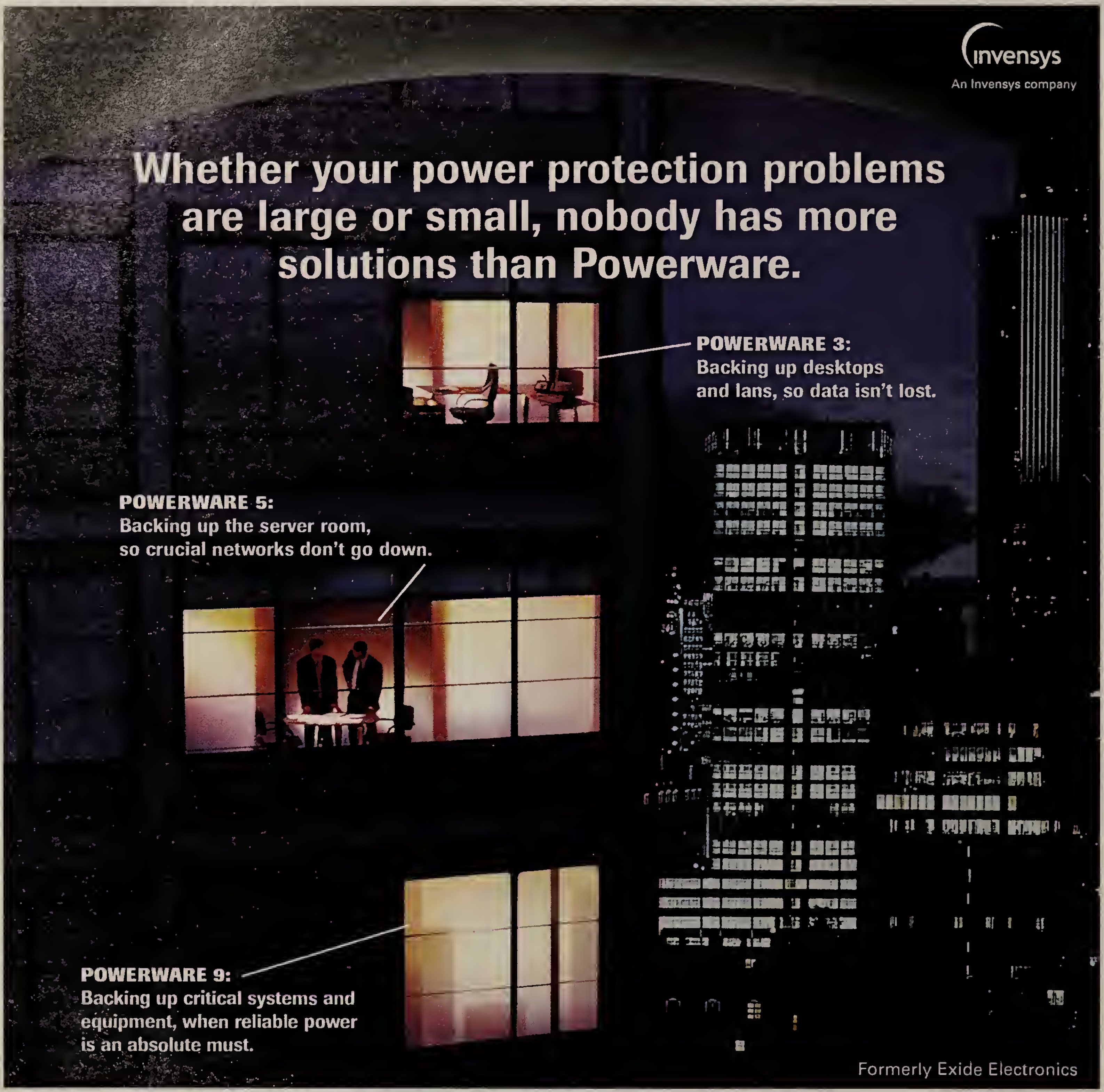
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hindering SAN progress. There's no single management standard: Some vendors have proprietary management software to control their devices. Others incorporate HP's SureStore E SAN Manager LM software. Still others have formed blood-brother relationships with traditional system management vendors, such as Computer Associates, to codevelop storage management packages.

The importance of management shouldn't be downplayed. The advantages of SANs — LAN-free and serverless backup, data vaulting, remote mirroring, dual-active copying, high availability and fault tolerance — make managing a storage network more complex. Managing storage is so essential that it costs $7 more per hour than storage itself. According to Dataquest, the storage management market will exceed $6.6 billion in 2003, up from $2.6 billion in 1998.

Vendors need to convince more users to adopt SANs and to convince those that do to be more aggressive. To do that, vendors need to agree on standards, guarantee interoperable products and resolve management shortcomings — in short, deliver on the promise of heterogeneous SANs. ■

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The fight for e-trillions

Trouble is brewing over business-to-business e-comm standards. BY JULIE BORT

It's easier to swim through a vat of spaghetti than to keep track of the many standards efforts for business-to-business e-commerce. Funny thing about standards, unless everyone agrees on one, you don't have a standard — you have Unix all over again.

Nevertheless, a plateful of work is being done on e-commerce standards, much of it overlapping or conflicting, and chiefly in two areas: XML and codifying business practices.

Ask any vendor about its involvement in business-to-business e-commerce standards and you'll get an ear full of XML. Yet unlike other standards, only XML's syntax has been standardized.

While it's great that Web developers can now tag anything, unless some agreement is made as to what the tags mean and how to process them, you might as well be speaking different languages.

Consequently, a cornucopia of work is being done to standardize tags and documents. The work manifests itself in two forms: Document Type Definitions (DTD) and schemas. DTDs, part of the World Wide Web Consortium's XML 1.0, basically declare what kind of document is being exchanged. Schemas, developed after Version 1.0, are more comprehensive. They include document structure, more rules and other attributes.

"A lot of the commerce standards are about DTDs. That's OK, but they don't scale well for e-commerce, and they tend to be vendor-specific," says Dave Burdett, technology group leader for Commerce One, a business-to-business e-commerce vendor in Walnut Creek, Calif. "A schema is much less processing-intensive. It needs less validation than a DTD because there's less rule-checking and handling. So it requires less resources from the infrastructure."

Still, it should be noted that the much-ballyhooed cXML, produced by Commerce One's arch-rival Ariba, is based on DTDs. "When you're talking about operating resources [not raw materials], as long as you defined a relatively complete order, the DTD order form is fine. But it's not intended for items like raw materials orders that require special scheduling," counters David Rome, vice president of marketing for Ariba.

ILLUSTRATION: VAL MINA

TOO MANY XML RECIPES

Perhaps a bigger issue is the sheer number of cooks in the XML kitchen. Two categories of groups are busily defining standards: vertical industry consortia and e-business platform vendors.

As for the former, some 35 industry-specific XML DTD/schema frameworks are being created in at least a dozen industries, according to OASIS, a vendor-independent repository of XML initiatives. The frameworks include the financial securities industry's Financial Products Markup Language (FpML); the travel industry's Open Travel Alliance; the architecture, engineering and construction industry's aecXML, and others.

Obviously, with so many burners fired up, there's a lot of repetition. The financial industry is a prime example. There's FpML, plus XML work by the Banking Industry Technology Secretariat; the Interactive Financial Exchange; the Financial Services Technology Consortium: the Bank Internet Payment System; and Checkfree, Intuit and Microsoft with their Open Financial Exchange.

No single reference implementation exists for XML. Each group is creating its DTDs and schemas from scratch — leaving a whole lot of variations to support. This is particularly harsh for horizontal businesses, such as wholesalers or retailers, which work with many vertical markets. They're forced to support multiple so-called XML standards.

"We preach to customers to use as many emerging XML standards as practical," asserts Shannon Denton.

senior vice president for Xcelerate, a Web site developer in Ft. Lauderdale, Fla., specializing in business-to-business e-commerce. "The real challenge is that there are competing consortiums out there — there's no centralized board."

Now add a cup of e-commerce vendors specializing in business-to-business trading. They try to attract customers with their own XML frameworks. Such frameworks concentrate on common business documents such as purchase orders and return authorizations; a company could then customize them. Frameworks in this genre include Ariba's xCML, Commerce One's Common Business Library and SAP's mySAP.

Place this mixture into a scorching hot fire — otherwise known as Microsoft's BizTalk, an XML schema repository. Groups register their schemas with BizTalk, and it translates one to another. This type of translation is a page right out of electronic data interchange. True to form, Microsoft has gotten ahead of the standards process, using an extended schema and its own exchange methods.

Yet because of Microsoft's clout, everyone who's anyone is working with BizTalk. This, in turn, has caused fear among competitors that Microsoft is covertly trying to control XML. There is some reason to worry — BizTalk will be supported in Microsoft products such as Site Server Commerce Edition and Office 2000, and is available as the Microsoft BizTalk Server, now in alpha.

"A lot of people will see power to drive the standard in Microsoft. But by definition, a standard is not controlled by a single company," says Jim Hoyt, vice president of technology for Sterling Commerce, a longtime EDI vendor that offers a competitor to BizTalk, Gentran:Server.

With all this activity, it would seem that XML is the only e-business standard. Not true. About 18 months ago, Open Buying on the Internet (OBI) was released and widely hailed as the business-to-business standard to watch. But it was hardly the rallying dinner bell that its creators hoped it would be. Loosely aimed at the office supplies market, OBI has achieved a modicum of support from vendors such as Ariba and SAP. However, the specification's complexity, coupled with the rise of XML, has taken the steam out of it, e-commerce vendors say.

"OBI has not turned out the way people anticipated. It's about sell side. Pieces of OBI, like the transfer of purchase orders in OBI format, are supported," says Mike Micucci, director of product marketing for Commerce One.

The upshot is that XML doesn't make business-to-business e-commerce easy, just easier. Integration between e-business applications remains a custom-coding affair, says Anne Marie Kean, vice president of business-to-business e-commerce for Staples in Framingham, Mass. Staples uses XML and OBI to conduct e-commerce with its business customers. Staples integrates its catalogs with a customer's procurement systems or proprietary office-supply applications.

While her customers frequently request that such integration use XML, Kean says that with all the variations, it's not the quick process her customers imagine it to be.

"I don't see a pattern, other than variations of XML," she says. "Each procurement system has its own version, and that's what we have to do to support our customers."

OTHER STANDARDS ON THE MENU

Codifying good e-commerce business practices is another area of standards work. At least two organizations have taken on this task: the Global Information Infrastructure (GII) in Foster City, Calif., and the Organization for Economic Cooperation and Development (OECD) in Paris.

The GII's thrust is its Standard for Internet Commerce. The standard is drafted and voted upon by more than 200 analysts, consumer advocates, e-commerce enterprises, educators, journalists and vendors.

GII's hopes to increase trust in e-commerce by: 1) letting the industry dictate its own conduct; and 2)

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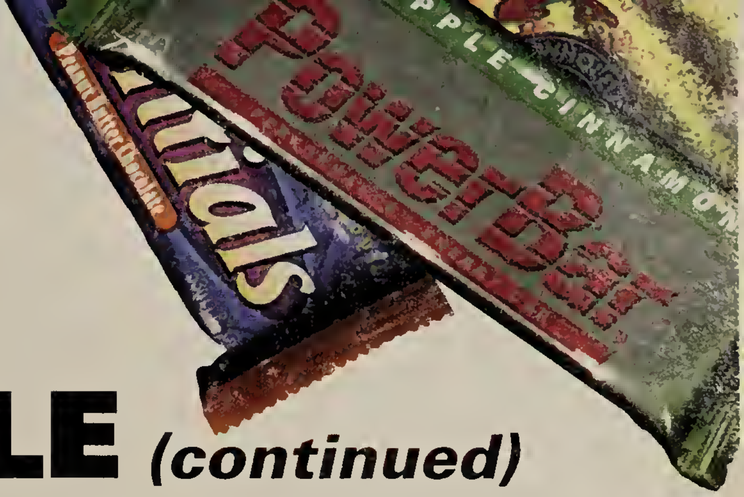

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providing guidelines that give shoppers a consistent experience. It covers business practices, like the minimal acceptable response time for a customer-service query, the information an e-business should post about itself and what data to include when verifying an order via e-mail. The second and final draft was released in mid-December.

Similarly, the OECD covers some of the same ground as the GII, but is also international and involves broader issues. The OECD is well-known for its roles in various international trade initiatives. It has recently developed Guidelines for Consumer Protection in the Context of Electronic Commerce, an OECD Council Recommendation.

"Council Recommendations are nonbinding, but since they are, in effect, jointly drafted by the governments of the OECD Member countries, there is a certain moral obligation to meet them," says John Dryden, head of the Information Computer and Communications Policy Division Directorate for Science, Technology and Industry at the OECD.

Although drafted with consumer confidence and protection in mind, the guidelines have obvious implications for business-to-business e-commerce, as well. They cover areas such as fair business and marketing practices, online business and information disclosures, the handling of consumer complaints and dispute resolution.

The OECD has also begun to tread lightly in the areas of international taxation, legal jurisdiction and tariffs. While the guidelines don't make specific recommendations for the latter two, taxes are a different dish.

"The tariff issue is a bit different from that of taxes — although a tariff-free zone in cyberspace for electronic transmissions makes sense, the same is not true for taxes — there is no reason for cyberspace to be a tax haven," Dryden says. Currently, member countries have agreed to let trade develop electronically without tariffs.

But saying that countries should be able to collect taxes requires solving the obvious technical problems of performing the task. So the OECD has created a taxation "framework conditions" report offering guidelines on how to apply tax rules to electronic transactions. This document also suggests areas for future work concerning "consumption taxes, direct taxes and tax administration," Dryden says.

Overall, the enterprise that dines at the e-business table must track an awful lot of undercooked standards work. Network executives should begin by scouting out all relevant XML work being done in their companies' industries, via their suppliers and customers as well as organizations such as OASIS (www.xml.org). Executives should further study the construct of that work — DTD or schema — to evaluate the possible effect on the network.

Likewise, every enterprise should be taking note of evolving best business practices. This is the bar to which they will be expected to compete. And those with international interests should stay abreast of technology and practices involving taxes. Having piled the plate high with such information, the last step . . . mangia! ■

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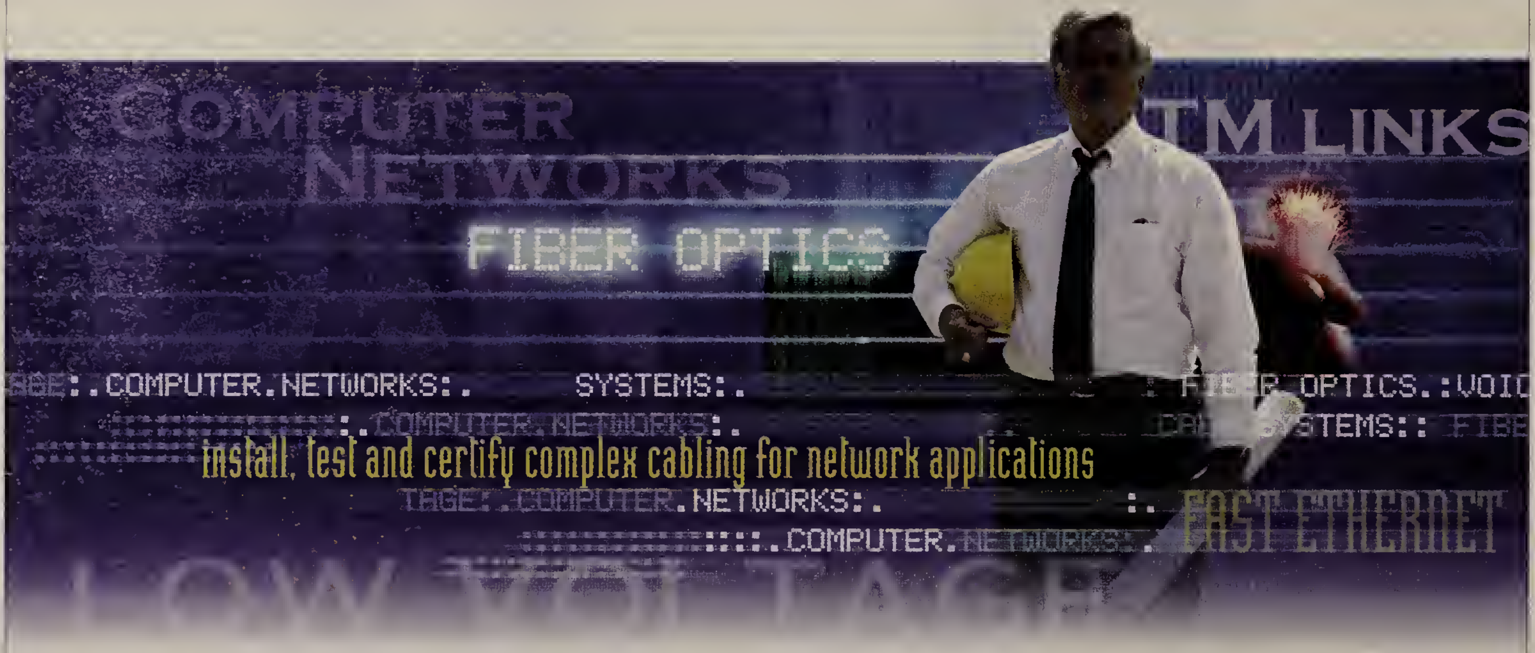
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In the way of open access

Giant carriers use the desire for Internet deregulation as a pawn in their power struggles. BY DAVID ROHDE

Almost everyone has heard of the political marriage pairing Republican strategist and conservative talk show host Mary Matalin with colorful Bill Clinton defender James Carville.

But Matalin and Carville aren't the only Washington power couple who must be having political shouting matches over dinner these days. Take a look at Susan Molinari and Bill Paxon, married former members of Congress who are suddenly on opposite sides of a most unlikely issue — broadband Internet access.

Molinari, a former rising star from Staten Island, N.Y., and keynote speaker at the 1996 Republican National Convention, is co-executive director of a group called the Internet Advancement Coalition. Paxon, who gave up his Buffalo, N.Y., seat shortly after Molinari stepped away from hers, is a paid consultant to a group called the Competitive Broadband Coalition (CBC).

Sounds innocuous enough until you realize what these two groups are all about. The Internet Advancement Coalition, or iAdvance, is heavily funded by regional Bell operating companies SBC Communications and Bell Atlantic to lobby for a change in telecom law that would enable RBOCs to build long-distance data networks — in other words, Internet backbones — before they have long-distance voice authority. The CBC is heavily funded by AT&T, MCI WorldCom and others precisely to stop the RBOCs from gaining this authority.

Of course, neither group publicly states its goals that way. The iAdvance group says it's all about "Bringing the Internet up to speed for all Americans!" The CBC says it is "dedicated to protecting the competitive environment in which the Internet was born and continues to evolve."

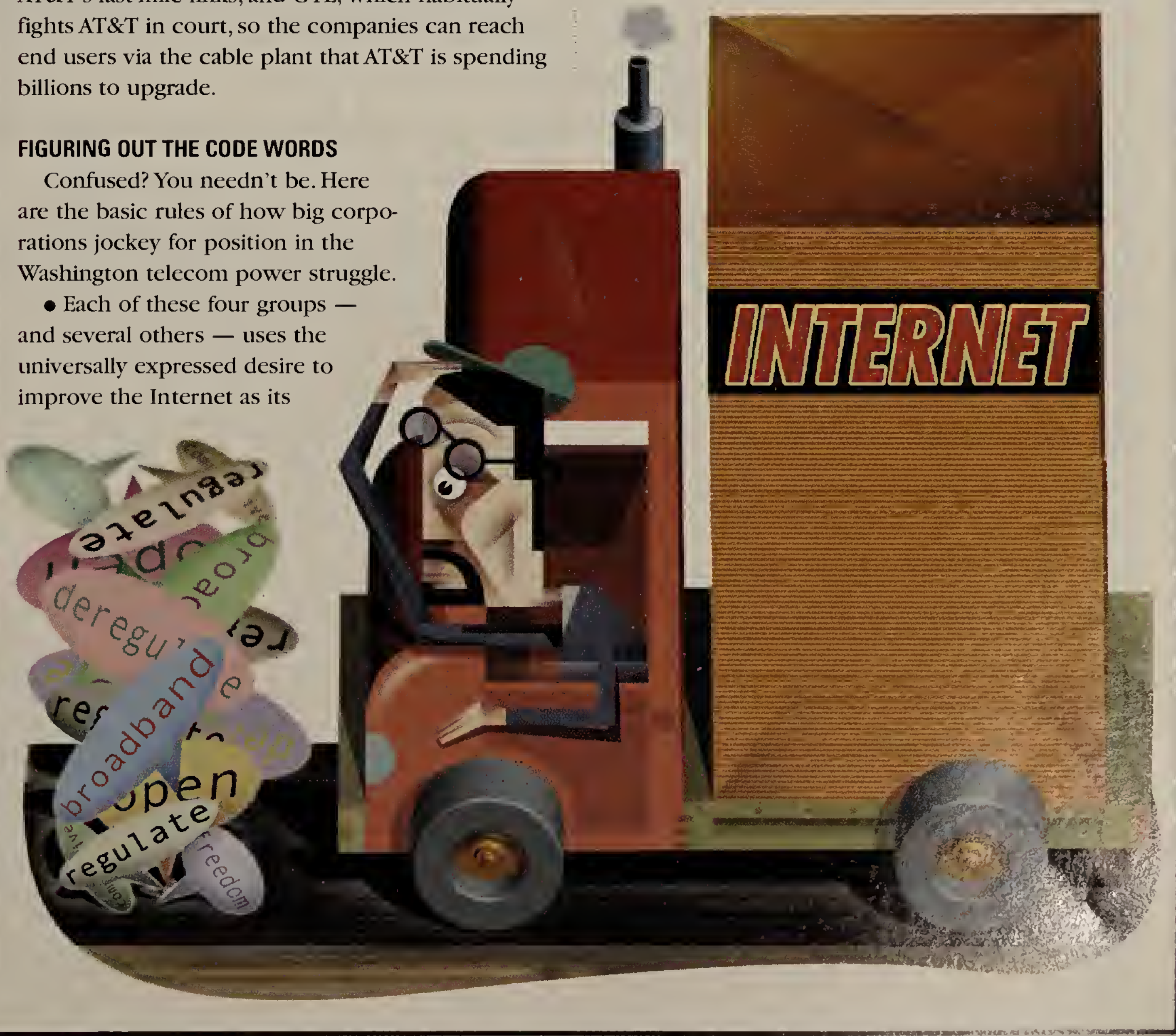
But those aren't the only players. Consider a third group with the provocative name "Hands Off the Internet." In ads and on the Web, the group describes itself as "a coalition of 'Net users" who believe "the Internet's phenomenal growth stems from the ability of entrepreneurs to expand consumer choices and opportunities without worrying about government regulation." But critics charge that the group is nothing more than a front for AT&T to lobby against regulations forcing it to open its vast cable networks to ISPs. "Hands Off the Internet is a completely AT&T-funded puppet," says Greg Simon, co-executive director of yet another group — the openNET Coalition.

Oh, and what's that group? The openNET Coalition says it is "dedicated to promoting the rights of all consumers to obtain affordable, high-speed access to the Internet from the provider of their choice." But its critics say the coalition is just a lobbying front for America Online, which lacks AT&T's last-mile links, and GTE, which habitually fights AT&T in court, so the companies can reach end users via the cable plant that AT&T is spending billions to upgrade.

FIGURING OUT THE CODE WORDS

Confused? You needn't be. Here are the basic rules of how big corporations jockey for position in the Washington telecom power struggle.

- Each of these four groups — and several others — uses the universally expressed desire to improve the Internet as its raison d'être, even when what each group is really aiming at is a technical change in the nation's telecom laws.
- Each group employs former members of Congress and top officials of the Reagan, Bush or Clinton administrations to pitch its message. But forget Republican vs. Democratic distinctions — you can't predict which party partisans will join which group. Some of the groups have hedged their bets and hired well-known operatives from both parties.
- Code words are important. Each group appears at first blush to embrace the almost universal desire of 'Netizens to be "deregulated." Yet if you look closely, the words "competitive" and "open" usually wind up meaning "Let's put more regulations on our opponents," while "freedom" is often a



ILLUSTRATION

euphemism for "Don't regulate me, regulate the other guy."

Make no mistake, though: These groups are getting through to somebody on Capitol Hill. There are currently no fewer than seven bills in Congress with titles including the words "Internet Freedom," "Internet Growth" and "Broadband Internet Relief." Yet most of them have little or nothing to do with e-commerce taxes or the regulation of Internet content. Instead, they're actually bills loosening or tightening regulations on different types of telecom giants.

Some political insiders say all this activity is nothing more than an attempt by enormous carriers to leverage an interest in the Internet in order to get politicians to pick winners and losers in the ongoing guerrilla war of telecom regulation. To see how this works, take a look at the four principal lobbying groups, what companies support them and their policy goals (see graphic, this page).

Notice how AT&T, now the nation's largest cable company, supports a deregulation effort (Hands Off the Internet) for cable modems but takes a proregulation — er, "competitive" — stance for digital subscriber line services (CBC). For most of the Bell companies, it's the reverse. They support a deregulation group (iAdvance) for DSL but a proregulation — er, "open" — stance on cable modems (openNet Coalition).

HYPOCRITES ALL?

The big telcos all say they support Internet deregulation but at the same time sponsor groups that would push additional restrictions on competitors.

	Bells support	AT&T supports
Groups dealing primarily with DSL	🟨 iAdvance	Competitive Broadband Coalition (and www.noloopholes.org)
Groups dealing primarily with cable modems	OpenNet Coalition (and www.nogatekeepers.org)	🟨 Hands Off the Internet

🟨 Deregulation = Initiatives that call for no government regulation in an effort to spur investment.

Regulation = Initiatives that call for "open" or "competitive" markets via government regulation.

"These companies have done everything to increase competition for their competitors and decrease competition for themselves. That's all it's been about," says Neils Erich, co-chairman of the Telecom Task Force for the San Francisco Planning & Urban Research Association.

For an example of how this game played out in 1999, take a look at San Francisco. Last summer, the city's Board of Supervisors had to figure out whether to impose new regulations on AT&T after the carrier bought Tele-Communications, Inc. (TCI), which held San Francisco's cable franchise. The antagonists: Hands Off the Internet and the openNET Coalition, the two groups principally concerned with the cable-access issue. The result: a lobbying frenzy by supposed consumers.

"It was a shameful display of money badly spent," Erich says. "Both sides gave a lot of walking-around money to political consultants who bused in people who didn't know why they were there."

Even now, the two sides are still engaging in Bosnia-like recriminations. OpenNET's Simon, a former top aide to Vice President Al Gore, accuses Hands Off the Internet of arranging a fake demonstration in front of the Board of Supervisors that was nothing more than a "human chess game." Hands Off simply paid college students and employees of Excite@Home, AT&T's consumer ISP affiliate, to protest, Simon charges.

By contrast, he claims, members of the openNET Coalition who appeared before the board and other local governments have been the group's own members — employees and customers of hundreds of ISPs angered by AT&T's refusal to open its cable networks.

Hands Off Executive Director Peter Arnold — himself a former speechwriter for President Bush — will have none of it. AOL and what he calls "the local phone monopolies" are "spreading all sorts of absurdities," Arnold says.

In effect, the two sides simply neutralized each other with all the wrangling, Erich says.

WHOSE HANDS OFF THE INTERNET, EXACTLY?

The most incendiary issue is disclosure of funding and, by general consensus, the worst offender is Hands Off the Internet. In its initial announcement last July 1 — just as the San Francisco controversy was heating up — Hands Off the Internet described itself as "a coalition of civic organizations and high-tech associations" designed to "protect the Internet from increasing regulatory efforts pushed by state and federal public officials." Only at the end did the group mention AT&T as one of 15 initial members. Then it began running ads mentioning nothing about AT&T.

Even Hands Off members say AT&T is the group's instigator. One of the members is a San Francisco-based activist organization called NetAction, which in the past has attacked Microsoft for alleged antitrust violations and worked to get mostly liberal groups trained to use the Internet for organizing. "Hands Off the Internet — that's primarily supported by AT&T," says Audrie Krause, NetAction executive director.

Hands Off leaders are squeamish about the issue. After first telling *Network World* that Hands Off "gets all its money from members," Arnold eventually said: "You can say that we're backed by the cable industry. You're absolutely right in saying that." But openNET's Simon charges that Hands Off "keeps misrepresenting itself as representing the consumer," noting that Consumers Union and the Consumer Federation favor cable open access.

For its part, openNET says it fully discloses its funding, which comes from more than 700 organizations, mostly ISPs that want access to AT&T's cable lines. But NetAction's Krause says that's hardly the whole picture. She charges that GTE is paying the bulk of the coalition's legal expenses in certain local cable access fights, for example.

The two principal groups involved with trying to change — or retain — the DSL laws have been more circumspect. From the beginning, iAdvance Executive Director Mike McCurry — President Clinton's former press secretary — has been open about the fact that the group receives most of its funding from SBC, Bell Atlantic and computer maker Gateway. Its opponent, the CBC, makes clear on its Web site and in press releases that long-distance carriers and competitive local exchange carriers carry the freight. But CBC also runs a Web site (www.noloopholes.org) that appears more grass-roots, just as openNET runs a separate site (www.nogatekeepers.org).

TALKIN' DSL AND CABLE WITH DON IMUS

And political insiders say these stealth sites employ code words that are euphemisms for "regulation." CBC's advertising repeatedly accuses the RBOCs of seeking a "loophole" in the Telecommunications Act of 1996 without stating exactly what that loophole is. (In fact, it's a move to get data long-distance approval prior to voice long-distance approval.) The headline of one of CBC's ads reads: "Don't let big local phone monopolies squash competition in rural America." The unnamed "loophole" would "help 'em squash competitors who are ready to bring high-speed Internet access to rural areas." Meanwhile, "gatekeepers" is largely seen as an AOL-backed code word against AT&T's cable strategy.

Those words are particularly telling in Washington, where all of these groups have found more fertile ground for their advertising barrage. For example, iAdvance — the group lobbying to let RBOCs in data long-distance — advertises on Washington's all-news radio station, as well as in *Roll Call* and *The Hill* — two newspapers that primarily go to Capitol Hill staffers — and even on the "Imus in the Morning" radio show. Why? Not so much to reach consumers but to reach policy-makers.

"It's the level of attention," McCurry explains. Democrat McCurry and Republican Molinari together are running iAdvance, and they want Hill staffers to know that. "[That way] when you walk into a Congressional office, they don't roll their eyes and say, 'Oh, God, another telecommunications issue. I don't want to deal with it.' Instead, they say, 'Wow, I see you're doing this thing with Susan Molinari,' " he says.

THE POLITICAL DILEMMA FOR CITIES

All this presents a huge challenge for policymakers because different people are charged with ruling on telecom and cable matters. For example, many city governments believe they have the right to force open cable systems by requiring nondiscriminatory pricing but have no authority to do the same with telephone companies — something that's already been fought out among the federal and state governments and in the courts.

"If cities require the cable operator to do something with its pricing that they cannot compel the telephone company to do, then they're picking winners and losers," says Erich of the San Francisco Planning & Urban Research Association.

To some extent, regulators at the local and national levels recognize the dilemma. "There are millions being spent in dual efforts to define the issues in terms of open or closed access," said Deborah Lathen, the Federal Communications Commission's Cable Services Bureau Chief, in a November speech in Los Angeles. "You hear the sound bites: Open is good. Closed is bad. Forced is bad. Regulate. Don't regulate. I want to put aside all the rhetoric and talk about the reality." That reality comes down to two technologies: cable modem and DSL.

SOME WHO ARE PLAYING IT PURE

Two big carriers — BellSouth and MCI WorldCom — aren't playing the game the same way.

Unlike its RBOC brethren, BellSouth does not support the openNET Coalition. Instead, it supports deregulation of DSL and cable modems, saying AT&T should be allowed to do what it wants with its cable network so long as BellSouth gets regulatory freedom for data carriage. "We agree with AT&T — we don't believe that open access means what it says. It's just a euphemism for more regulation," says John Schneidawind, a Washington spokesman for BellSouth. "But we also think we shouldn't have to sell our advanced services to every Tom, Dick and Harry."

MCI WorldCom, meanwhile, takes the exact opposite tack: It's a member of the pro-AT&T CBC but also the anti-AT&T openNET Coalition. All the other companies are inconsistent because of their investments, says Washington spokesman Peter Lucht: "They all want open access to the technology that they are not deploying, and they don't want open access to the technology that they are deploying. We want to horn in on both."

One of the biggest names in the lobbying fight says he's trying to work toward a settlement. The iAdvance group's McCurry concedes that the group is fighting for deregulation of Bell DSL lines but is also in favor of open access — that is, at least temporary regulation of AT&T cable lines.

McCurry says he agrees that it would be better if both sides argued for more deregulation for all players. The problem, he says, is that the RBOCs start from a much heavier degree of regulation than the cable companies — cable TV players have never before had to provide local loops to competitors the way the RBOCs do.

But all that has involved some explaining to his backers that they need to show some real market interest in DSL. McCurry says he can't even get DSL at his home in Montgomery County, Md. — one of the nation's richest area. "I've yelled at the guys from Bell Atlantic," McCurry says. "I've said: 'Hey, I'm the head of this coalition. Give me DSL.' " ■

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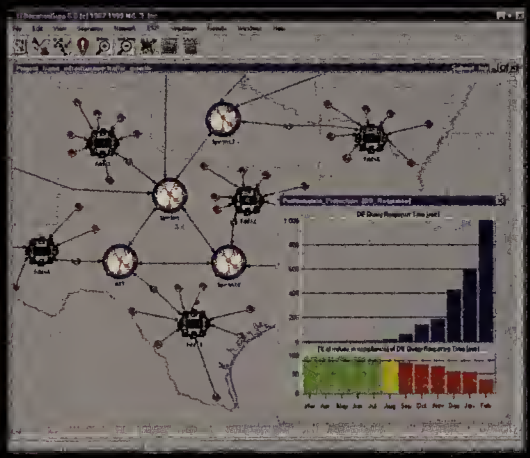

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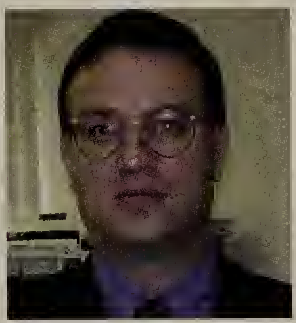

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10/99 DK—000176B

Power up!

It's not too late to throw in another resolution or two. Here are some tips for bolstering your corporate image.

BY TOM DUFFY

Let's face it. The CEO's secretary often doesn't know the difference between a network card and a credit card. Yet after the CEO, she's the most powerful person in the operation.

Who else, after all, has such easy access to the head honcho? Who else knows the important things, such as what, where and with whom he likes to eat? And is there anyone with a better handle on what the CEO is thinking than the person who watches everyone come and go from his office? Not likely.

Sadly, you might never accumulate as much power as that secretary. Still, resolving to increase your power and influence in the organization is a good way to start the new century. This is especially true if your career is progressing at a baud rate of 2,400 while those with questionable work habits and less impressive résumés have been passing you by at T-1 speed. But how?

Power is an odd mix of perception and reality: The secretary is powerful not only because she has access but also because everybody knows she has access. But power doesn't always come with the position. Just because you're one step below the chief technology officer doesn't mean you have a commensurate amount of power. And if you don't have it, you can't go out and get it as quickly as, say, you could bring a new server online.

Preaching technology from the faculty pulpit **has empowered Jim Gogan, director of networks and communication, in his workplace: the University of North Carolina at Chapel Hill.**

PHOTO: CHARLES BROWN

POWER SOURCES

Typically, power is bestowed as a result of an achievement or a series of them. Maybe you guided the company through a seamless transition from PCs to thin-client technology. Or perhaps you developed a specialty in virtual private networks just as your firm was transitioning to one. But you sure as heck didn't get power by failing to distinguish yourself, says Shaun Kelly, a senior search consultant at EDP Staffing Services in Newington, Conn., and *Network World's* Career Doctor.

"If you are one of those people who shows up to work and that's the best your colleagues can expect of you, even if you're there for 20 years, they won't look up to you, they'll just look at you," Kelly says.

So go out and show some moments of brilliance. But keep one other thing in mind in this tricky arena: Power is often seen as something that we acquire through action. Yet there is something of the Buddhist philosophy at work, especially in the higher echelons. Sometimes, the best way to gain power is to give it away.

And sometimes the best way to gain it is to change the way you're perceived. It worked for Jim Gogan, director of networks and communication at the University of North Carolina at Chapel Hill

Gogan has found that by improving how others see him, he has increased his actual power. A few years ago, he began teaching a continuing education course called "Protocols and Network Management." In a world that prizes academic credentials above all else, Gogan's move was a smart one. Now students, faculty and staff are more likely to listen to what he has to say.

"It's one thing if you say something as a staff member about how a certain technology has to be installed," he says. "It's another thing if you are saying it from the faculty pulpit."

WINNING THE POWER GAME

Establishing yourself as an expert is one of the quickest ways to boost your power supply. Technology folks have always suffered in the power game because they've been seen primarily in a support role. But those who have gained more power and influence for their departments have realized that the best approach is to make their organizations critical to the business itself.

Look at what Ray Kump has done at Mitsubishi Electric Automation, a maker of products that automate manufacturing processes in Vernon Hills, Ill.

When Kump, the IT director, launched an SAP enterprise resource planning implementation two years ago, he hired people from the business side to oversee the implementation of particular modules. A key manager from the repair side of the business joined IT to oversee the service and repair module, while a former planning manager is handling the planning and manufacturing module.

The people who are filling the posts came with little technological experience. But that hardly mattered to Kump. He knew the modules were sophisticated enough that they only required manipulation of the business logic rules within SAP, which could easily be done by someone without a deep technology background. Kump also gave them the title "business analyst" to emphasize their importance.

"Now when they speak with the senior managers of the business units they support, it is a collaboration of ideas," he says. "They have become business partners blending their understanding of Mitsubishi's methods with their knowledge of SAP application systems."

Kump says the move has strengthened the role of department managers, as well as of him and his division. "Now senior managers rely on the IT support structure for problem resolution and strategic planning," he says.

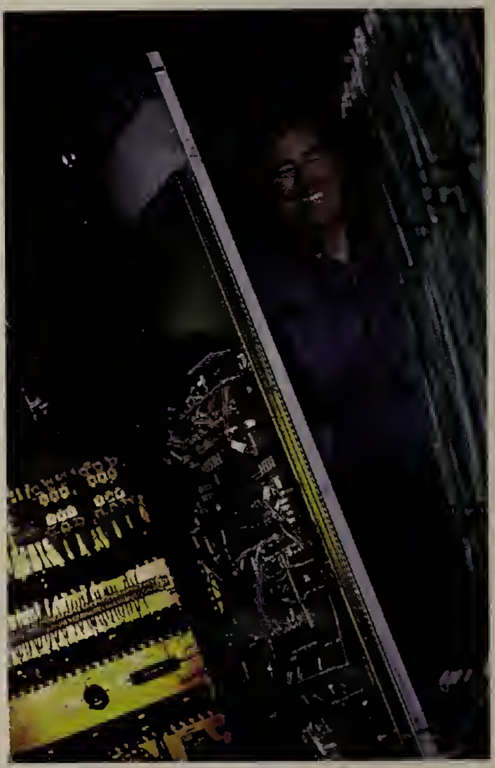
Michael Hinkle-Morrison, a former chief information officer (CIO) and now an independent consultant in Dallas, agrees that making your organization critical to the business is key to improving your power. He believes that his early experience marketing Unix and PC products for Texas Instruments made him more powerful and influential when he went on to serve as CIO in other fields. It also didn't hurt that he went back to school for an MBA.

"It forced me to think nontechnically and to be able to talk and act the language of net present value," he says.

The subtext is "respect." Gain it, and you've got power. Lose it, and watch power slip through your hands like sand. One way to gain respect and increase the power of your whole organization is to follow the advice of the mentor who once told Hinkle-Morrison: Power is what you give away.

"It's called trying to let go of your ego and not thinking that you can control everything," Hinkle-Morrison says. "It means putting faith in and giving responsibility to people and holding them accountable."

Ceding power to others can be nerve-wracking for insecure technology managers who see themselves at the top of a hierarchical ladder. But doing so increases the confidence of those around you and can enhance the influence of the entire IT organization. Hence the idea that power is something that you give away. This is all well and good, but you can't give it away until you've got it. And let's face it, the best way to do that always will be by impressing the boss. Fortunately, there are endless ways to do that.



IT director Ray Kump has created a powerful SAP applications team at Mitsubishi Electric Automation.

PHOTO: ERIC HAUSMAN

You might try getting yourself on a committee that the CEO is on. Or shop around for a problem that can be handled with a simple solution. If all else fails? Well, EDP Staffing's Kelly has a daring idea. He suggests getting to work early and parking in the CEO's spot.

"When the guy comes looking for you, you'd better be doing 18 things and being so productive that he'd want to move the car for you," Kelly says.

This, of course, is a risky maneuver. Try it only as a last resort.

Duffy is a freelance writer in Somerville, Mass.

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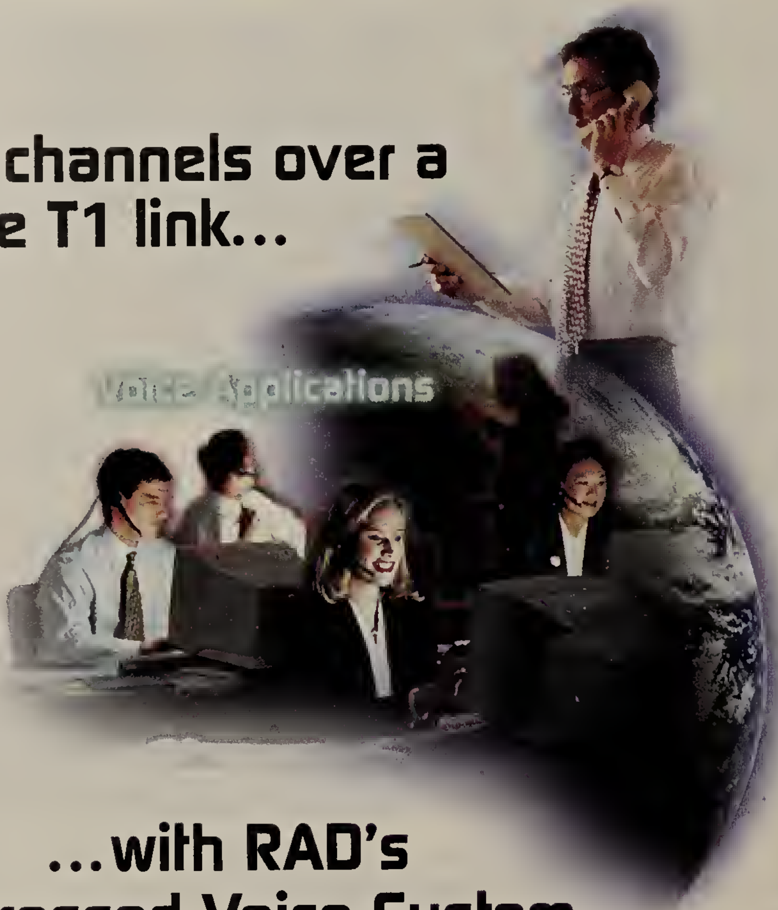

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Counter points

Backspinner Mark Gibbs and 'Net Buzzer Paul McNamara go head-to-head over an increasingly contentious business issue. Do you enact stringent e-mail and Web usage policies, or do you let employees use these resources any old way they want?

MARK GIBBS

They say the next big thing is here
That the revolution's near
But to me it seems quite clear
That it's all just a little bit of history repeating.

— "History Repeating" by the Propellerheads

When it comes to business, keep these axioms in mind:
1) Anything that is very difficult and not a life-or-death issue won't get done.
2) Things that don't save or make significant money won't get done.
3) People and organizations take the path of least resistance.

The proposition that corporations will clamp down hard on e-mail and Web browsing seems, at face value, reasonable. After all, money is involved. But it violates all of the axioms above. As they say, it's a load of horse puckey.

Think of it as an equation: If the value of e-mail and Web access control isn't significantly greater than the cost of the control mechanisms, control doesn't make sense.

"Ah," you may exclaim, "but there is real value! What about all that wasted staff time?" Sorry, I don't buy that argument because the costs are illusory. Think of how this cost is calculated: "The average employee is paid $Y per hour and browses the Web for Z minutes per day. Given the Q million workers in this industry, $X is lost every year."

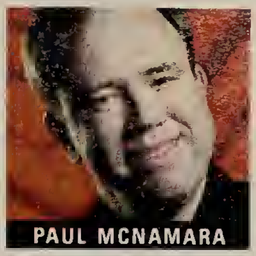
In reality, you can't possibly glue all of those blocks into chunks of hours unless you are going to micromanage employee schedules. And smart corporations recognize that you don't get results from micromanaging people. You set goals, manage by objectives and get out of the way.

The other factor to consider is the high price tag of controlling e-mail and Web use over the long term. The decision to exert control won't last long because the return on the investment won't make sense, and when there's no payback, the path of least resistance — not doing it — is the one to follow.

Access is cheap, and control is expensive. As employees get used to the medium and companies to managing by objectives, we'll find that if employees don't break the law and abuse company resources, management won't care.

The Internet is ushering in new business styles and ways of operating. In the face of revolutionary forces, many managers are over-reacting and thinking of implementing Draconian Internet usage policies. Is this unusual? Not at all: A similar scenario played out when telephones and photocopiers entered the business world, and look how relaxed most organizations are about these devices today.

This too shall pass, and we'll realize that it was just bit of history repeating. ■


PAUL MCNAMARA

Take this prediction to the bank: Bosses all over America will soon be yanking the full-access Internet privileges that have made checking stock quotes and sending e-mail as much a part of our workdays as the coffee break.

They will because "efficiency" has become the watchword of American business. They will because lawyers have become the ultimate power brokers of the boardroom, and sexual harassment lawsuits their scariest bogeyman. They will because the necessary filtering technologies exist to make Internet control more efficient. They will because they can. Which isn't to say that they should.

My colleague to the left argues that most bosses don't, won't and shouldn't care what workers are doing with Web browsers and e-mail as long as they get the job done. Moreover, he says, any effective policing of workplace Internet use is likely to flunk cost/benefit analysis. In a nutshell: Reason will prevail.

The heart hopes Mr. Gibbs is correct, but the head fears otherwise.

According to a study cited in a recent *Newsweek* story on "cyberslacking," 90% of workers admit to surfing recreational sites and 84% confess that not all of their e-mail is business-related. The rest of those surveyed are either lying, delusional or working for companies that have already unleashed the fun police. Business managers are not going to ignore those kinds of numbers, at least not for long.

Here's another telling nugget: 27% of businesses surveyed by the American Management Association already report that they are monitoring worker e-mail. This surveillance may be concerned with protecting intellectual property through filtering for telltale phrases such as "product launch." But why not simply add "Love, Dad" or "Meet me at the Motel 6" to that list of red flags?

Such will not be the case everywhere. More enlightened employers will still treat their workers as adults. However, at a newspaper outside Boston, a reporter was called on the carpet for having sent a résumé through the office e-mail system. How was she busted? Filtering. Why was a newspaper filtering e-mail? Not to prevent big scoops from being shipped to competitors, but because the paper is part of a chain owned by an enormous financial services company. One rule fits all.

Enjoy your surfing breaks while you still can. ■

ONLINE: Will the balance of power shift from employee to employer as companies begin forging tough e-mail and Web usage policies? Weigh in with your opinions online. **DocFinder: 6130**

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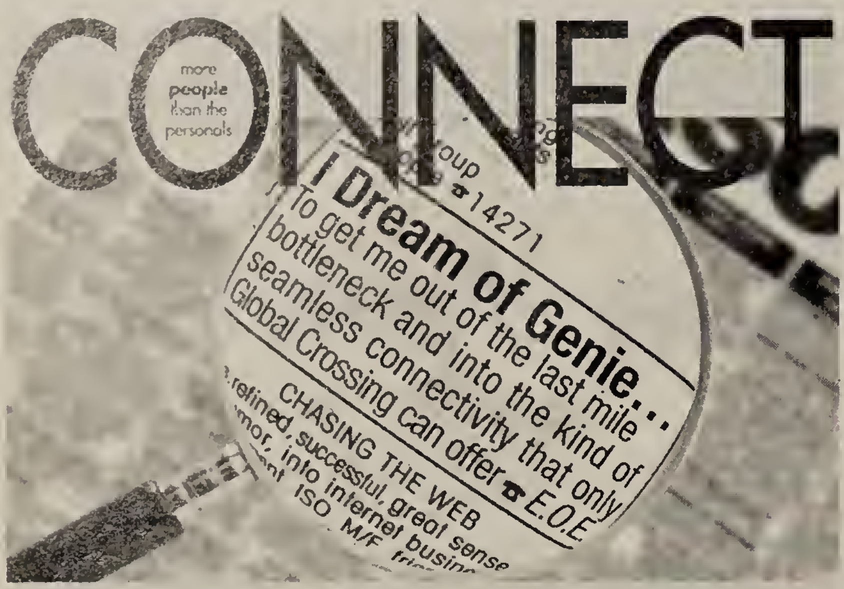
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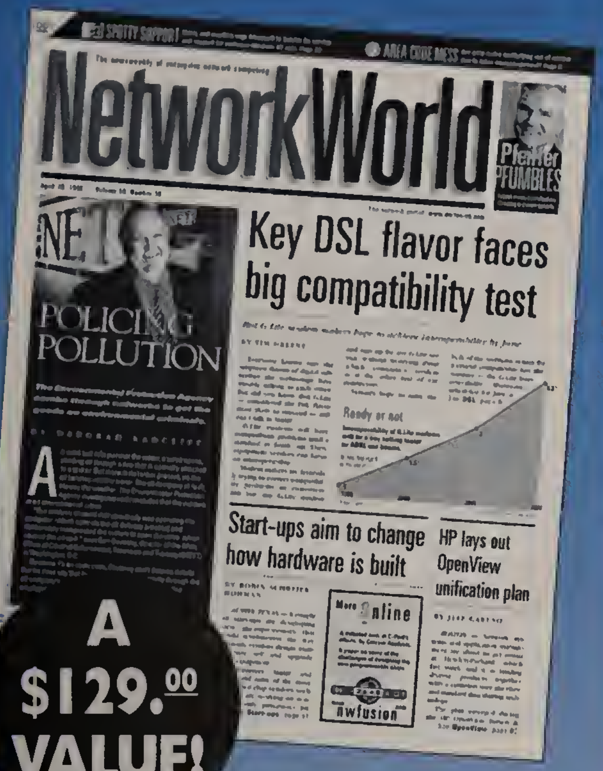

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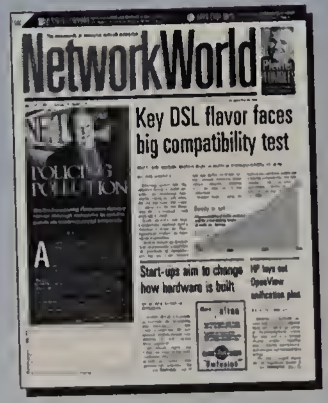
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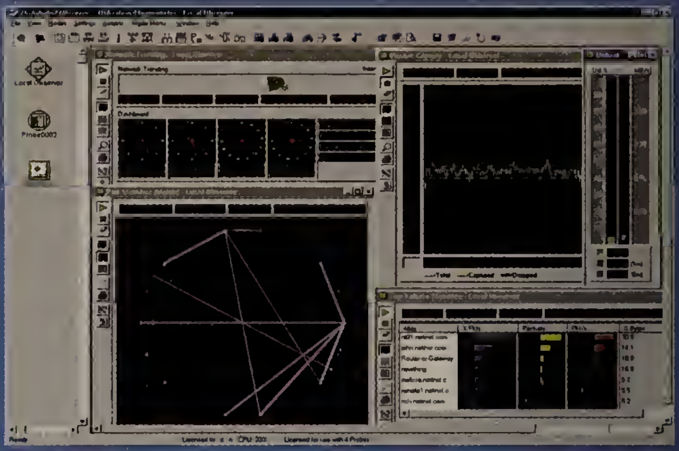

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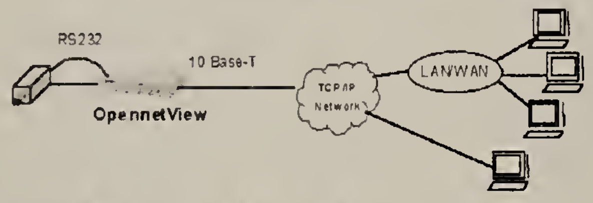

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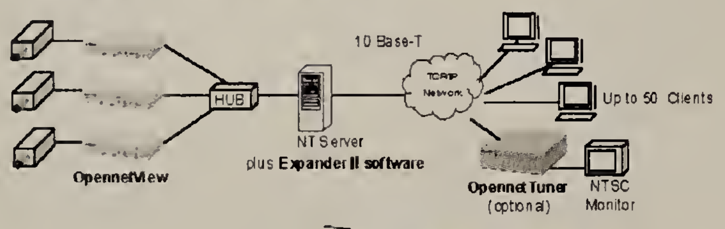

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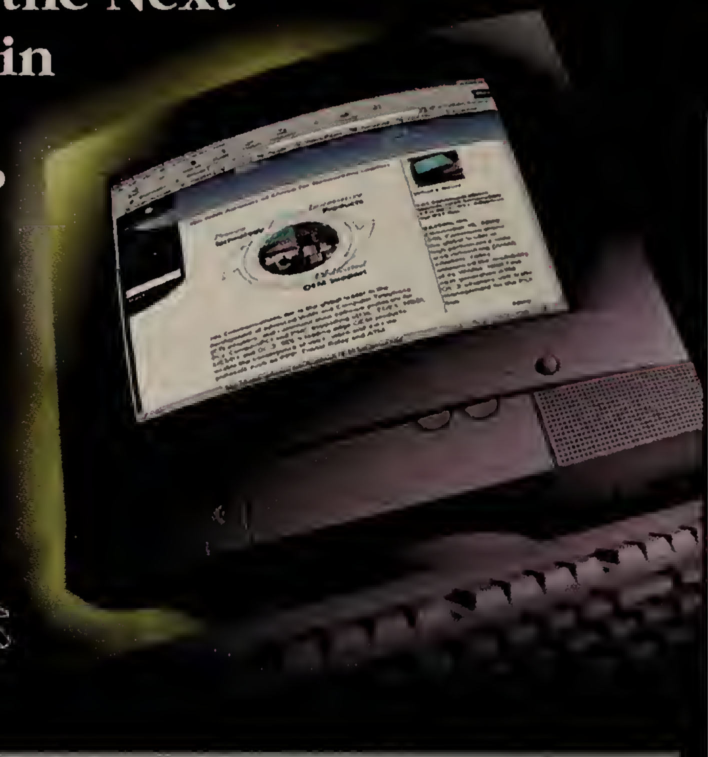

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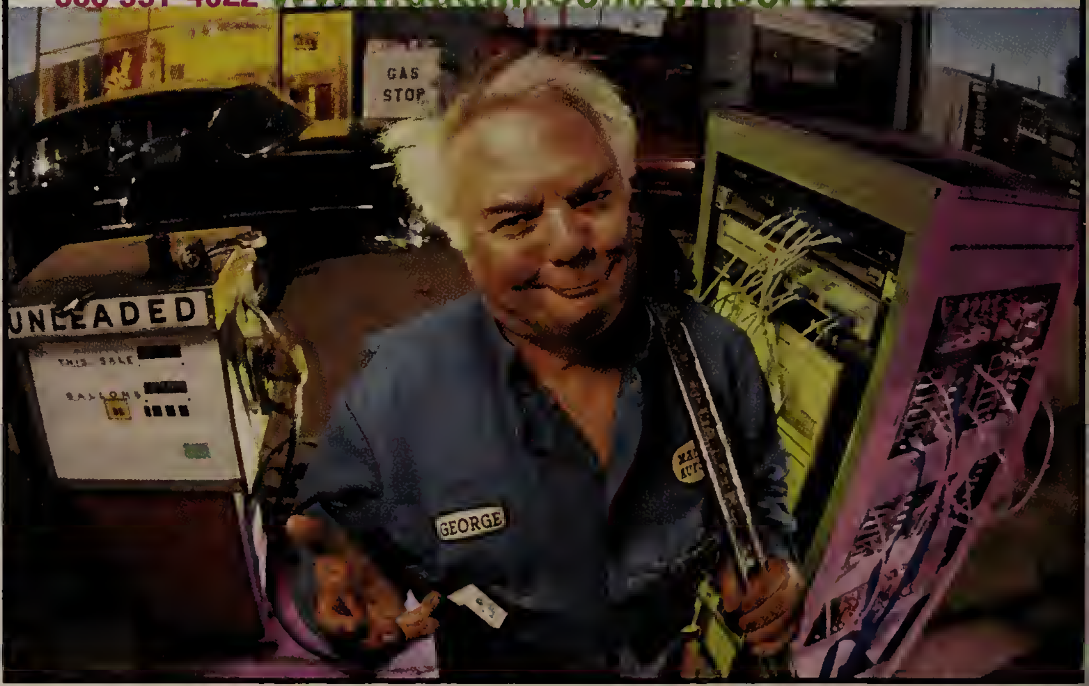

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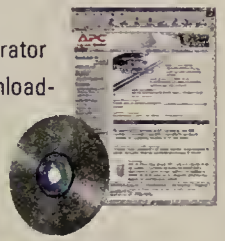

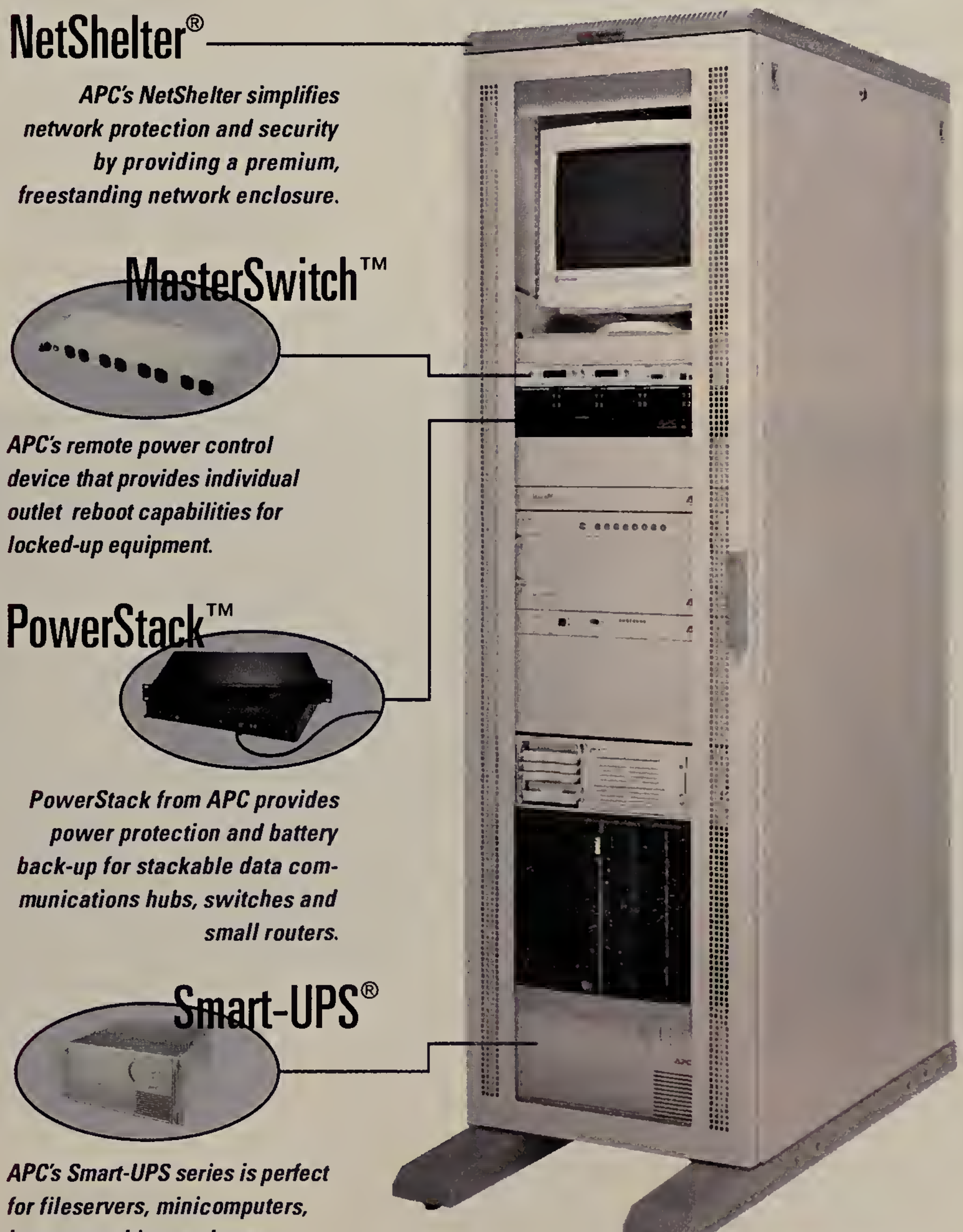

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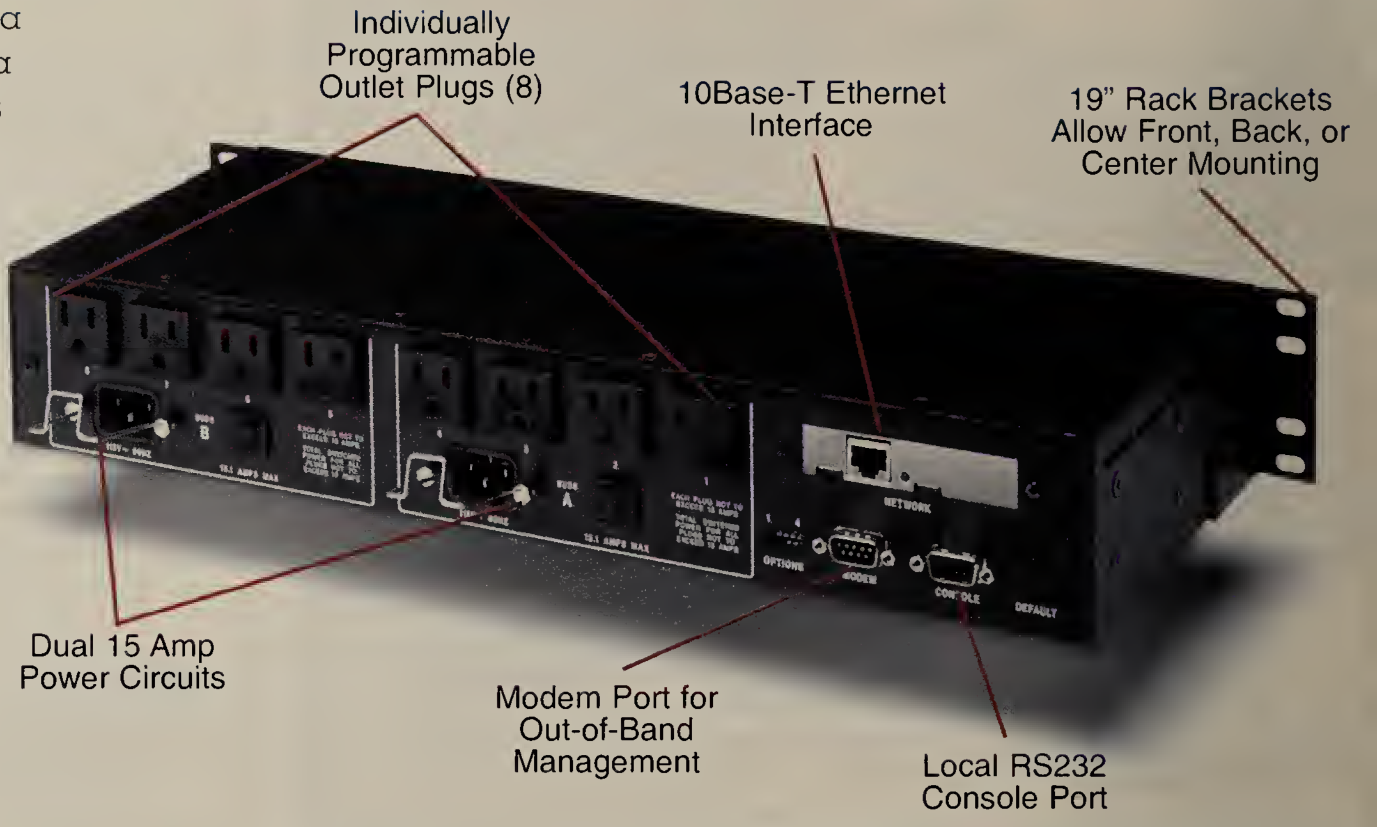
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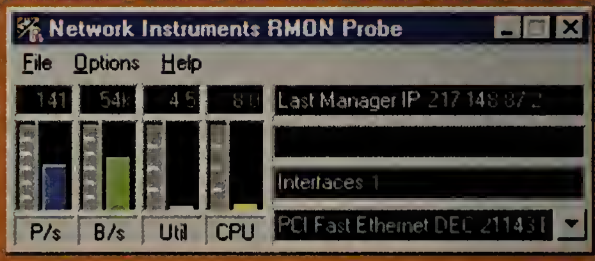

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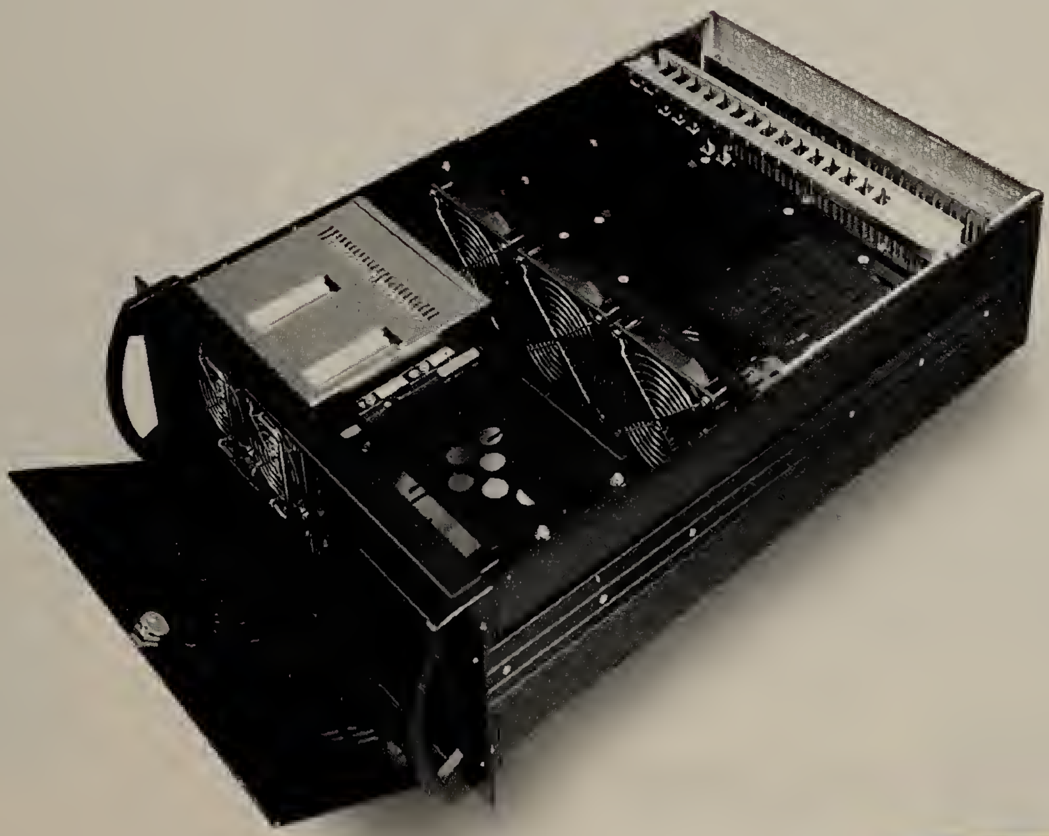

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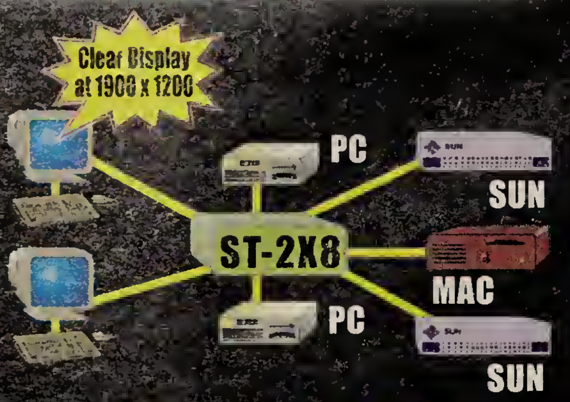

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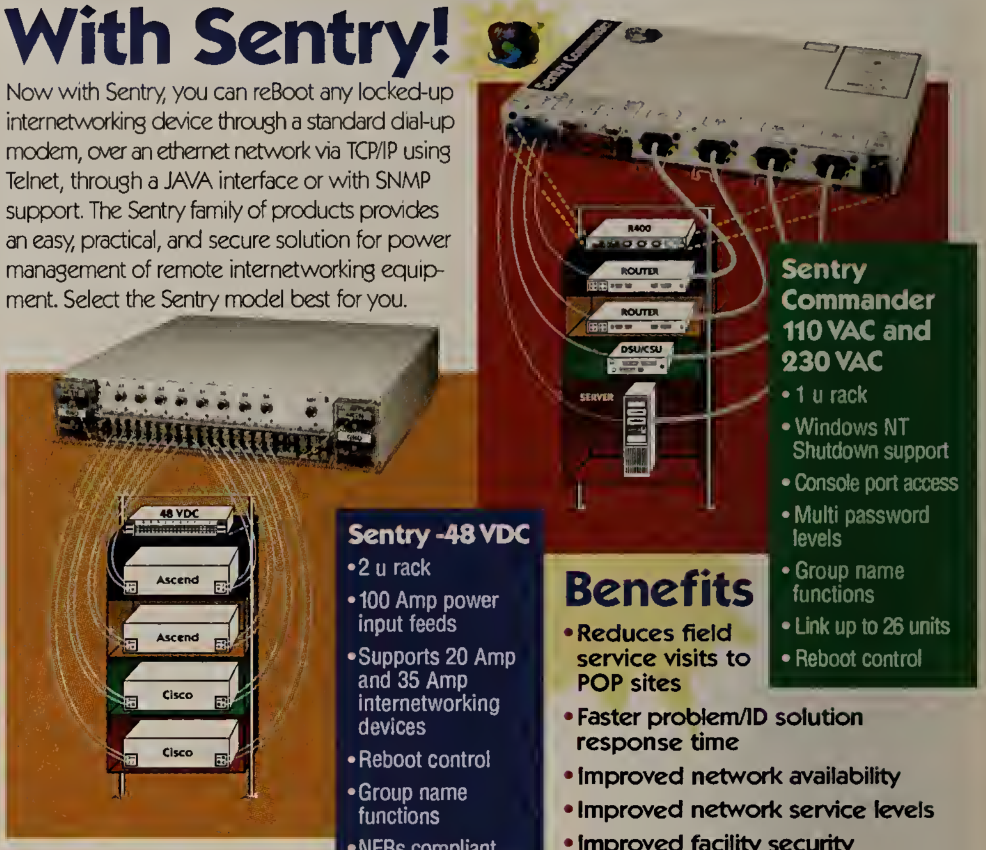

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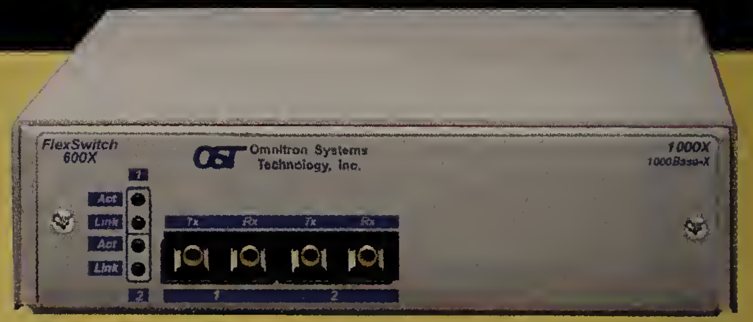

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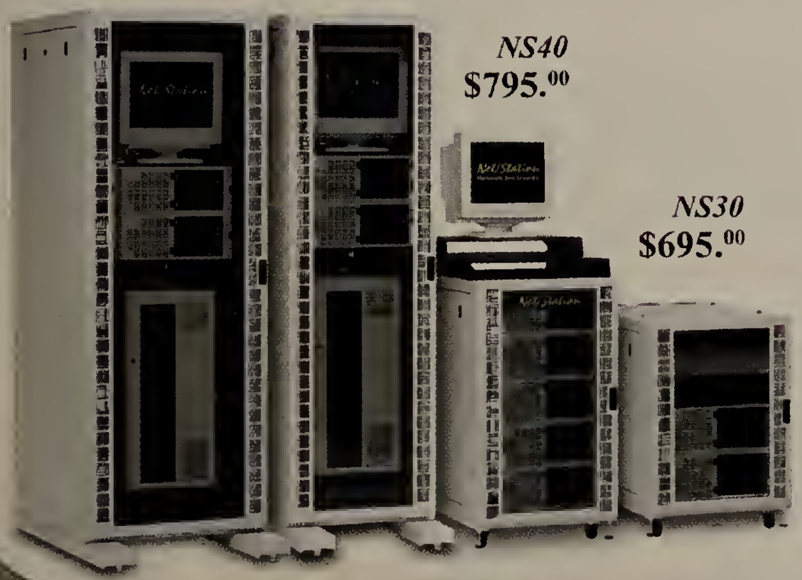

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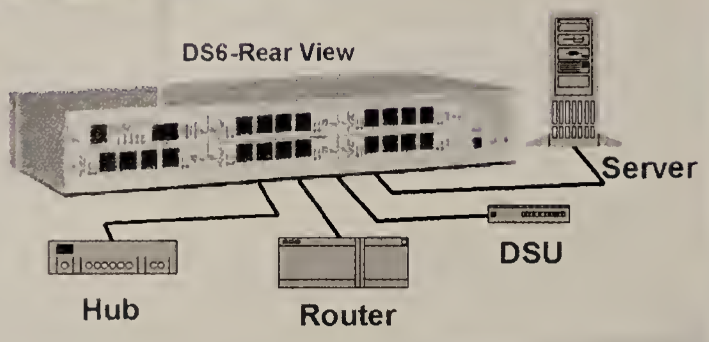

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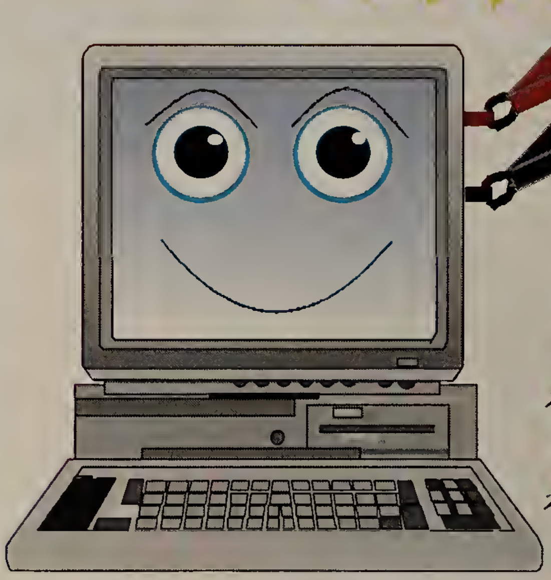

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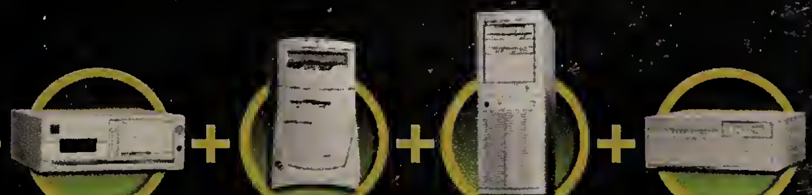

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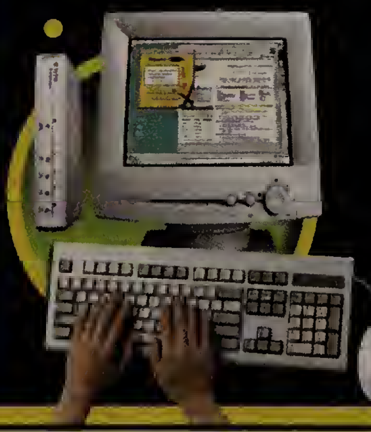

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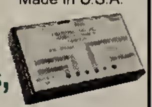

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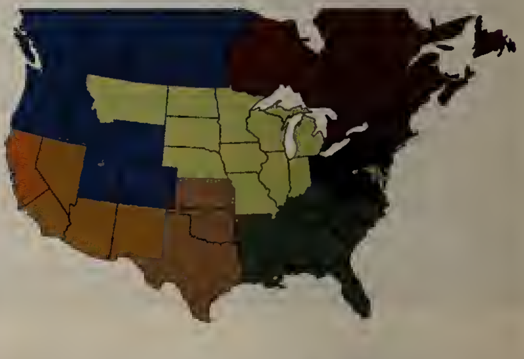

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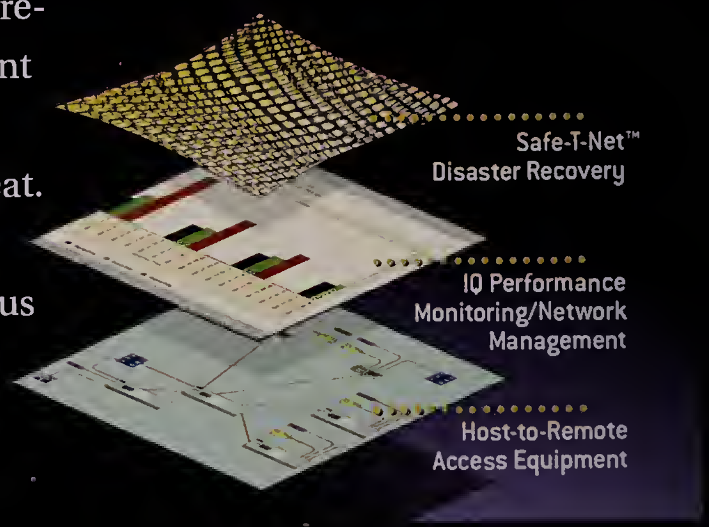

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